SpeedDome® Ultra Camera Dome

Installation and Service Manual

8000-1362-01, Rev. C

SpeedDome® Ultra
Camera Dome

Installation and Service Manual

8000-1362-01, Rev. C

MDR 6/97

FCC COMPLIANCE

This equipment has been tested and found to comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

EQUIPMENT MODIFICATION CAUTION

Equipment changes or modifications not expressly approved by Sensormatic Electronics Corporation, the party responsible for FCC compliance, could void the user's authority to operate the equipment.

WARRANTY DISCLAIMER

Sensormatic Electronics Corporation makes no representation or warranty with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Further, Sensormatic Electronics Corporation reserves the right to revise this publication and make changes from time to time in the content hereof without obligation of Sensormatic Electronics Corporation to notify any person of such revision or changes.

TABLE OF CONTENTS

Preface

Who should use this manual

Customer Engineers and Dealers who want to install and service the camera dome.

How this manual is organized

This manual contains the following four chapters:

1 **INTRODUCTION** provides a product overview and specifications.

2 **"INDOOR" INSTALLATION** provides procedures required to mount the dome indoors.

3 **"OUTDOOR" INSTALLATION** provides procedures required to mount the dome outdoors.

4 **SERVICE** provides troubleshooting and maintenance information.

Related Documents

Installation and service of this camera dome does not require detailed knowledge of how it works or its circuits. However, if this information is required, order the following document.

Theory for SpeedDome Ultra Camera Domes, document number 8000-1670-01.

Questions?

For technical support or questions that this manual does not address:

Customer Engineers call: 1-800-543-9740

Dealers call: 1-800-442-2225

SpeedDome Ultra Camera Dome

INTRODUCTION

About the Dome

The SpeedDome Ultra camera dome (Figure Chapter 1-1) is part of a programmable network of camouflaged cameras. These devices enable security personnel, from a remote console, to track a target, near or far, even in low light. Small and unobtrusive, the dome can be used in facilities such as retail stores, casinos, manufacturing facilities, hotels, and hospitals, especially where appearance is important.

Main Components

The dome consists of a housing and eyeball assembly that "twist locks" onto a mounting base. These components are described as follows:

- **Base.** Mounted directly to an indoor hard or tile ceiling, or to one of many optional indoor or outdoor mounting structures, the base supplies power and data to the housing and eyeball assembly, once it is attached.

  The base has terminal blocks that receive all video, ac, alarm, and data connections and has LED indicators that enable the installer to verify that power and data are available.

- **Housing and eyeball assembly.** The housing contains the dome's power supply, pan motor, and electronics used to operate the eyeball.

  The rotating eyeball, gloss black and 120mm (4.75") in diameter, contains a camera, camouflaged lens (incorporated into one of two removable slot covers), tilt motor, and associated electronics.

Camera Options

The dome, as shipped, contains one of four different CCD cameras.

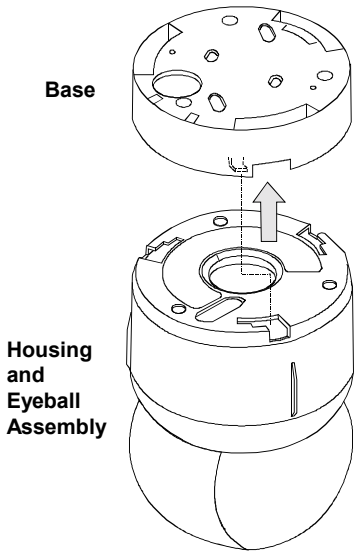
- Color NTSC (60Hz)
- Color PAL (50Hz)
- Monochrome EIA (60Hz)
- Monochrome CCIR (50Hz)

These cameras have 12X optical zoom with continuous auto focus and backlight compensation. An electronic zoom provides selectable magnification up to 18X or 48X.

Optional Slot Cover

Used in place of the slot cover mounted on the eyeball, this optional slot cover has a 0.5f darker lens to enhance eyeball camouflage. Order part number 0351-1163-01.

Figure Chapter 1-1. SpeedDome Ultra camera dome

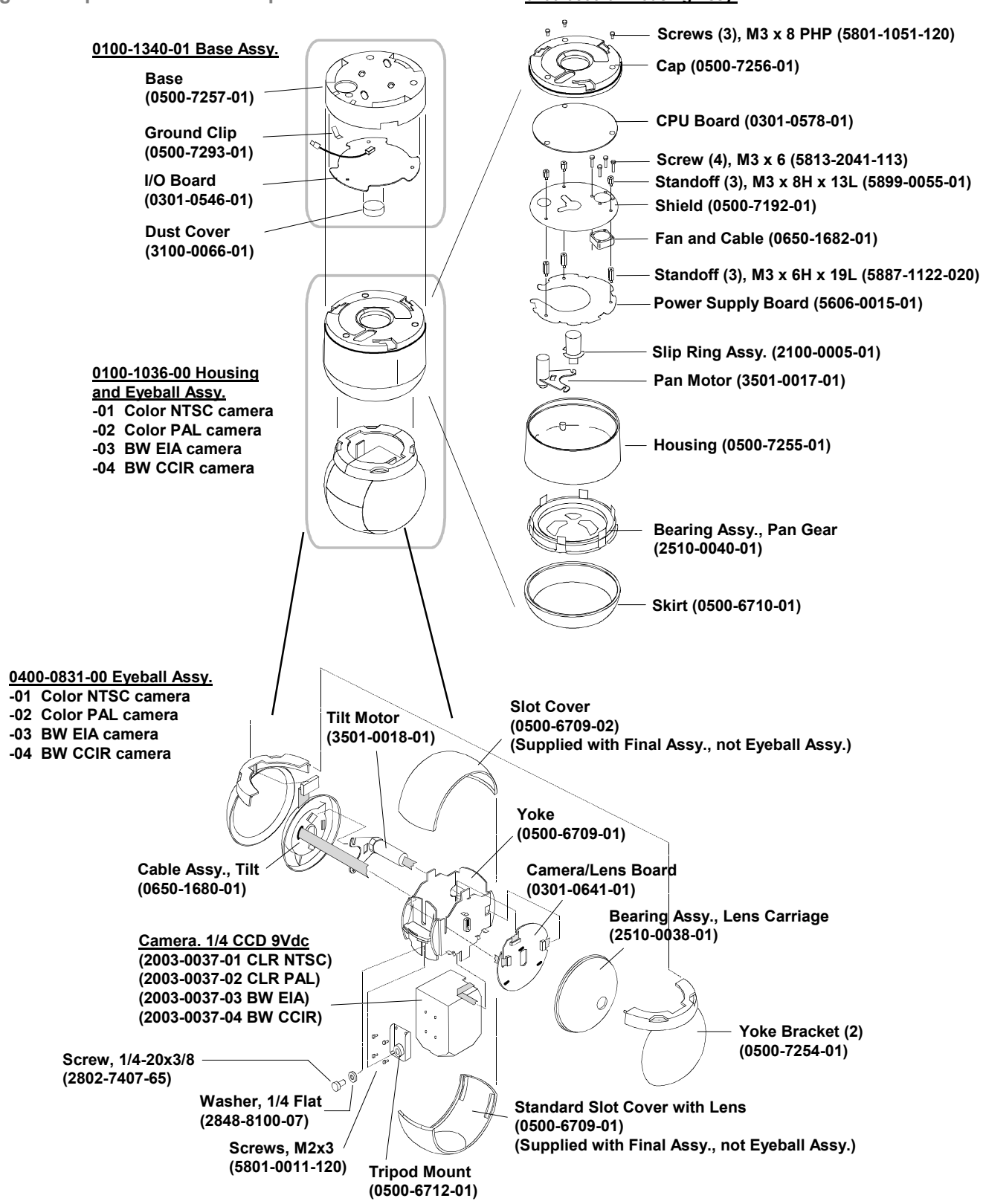


Basic Geneology

The dome is available in the four versions listed below. Basic parts are listed under each version. An exploded view is shown in Figure Chapter 1-2.

- RAS516LP Color NTSC (60Hz)
  - 0100-1340-01 Base Assy.
  - 0100-1036-01 Housing and Eyeball Assy.
  - 0351-1109-01 Install Kit
- RAS516LP-1 Color PAL (50Hz)
  - 0100-1340-01 Base Assy.
  - 0100-1036-02 Housing and Eyeball Assy.
  - 0351-1109-01 Install Kit
- RAS515LP Monochrome EIA (60Hz)
  - 0100-1340-01 Base Assy.
  - 0100-1036-03 Housing and Eyeball Assy.
  - 0351-1109-01 Install Kit
- RAS515LP-1 Monochrome CCIR (50Hz)
  - 0100-1340-01 Base Assy.
  - 0100-1036-04 Housing and Eyeball Assy.
  - 0351-1109-01 Install Kit

Figure Chapter 1-2. Dome components



Indoor Mounting Methods

The dome's base mounts directly to indoor hard or tile ceilings using hardware supplied with the dome, or to one of many optional mounting structures. These methods facilitate quick installation after site preparation, enabling wiring to be done during rough building construction.

An "install/removal tool" (not shown) can be used to easily attach the "twist-lock" housing and eyeball assembly to its base and to attach skirts and bubbles—without the need for a ladder. It can also be used to detach these components.

Hard/Tile Ceiling Mounting

The dome's base can be surface mounted directly to sheet rock ceilings, wood ceilings, or ceilings with special finishes (Figure Chapter 1-3). The base can also be mounted directly to tile ceiling T-bars where they intersect (Figure Chapter 1-4). Mounting hardware is supplied with the dome.

Figure Chapter 1-3. Surface mounting to hard ceilings

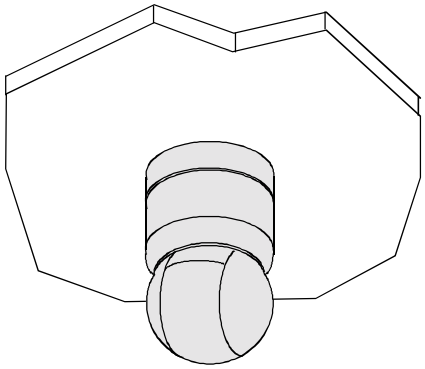
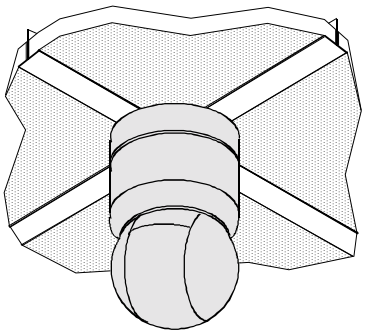


Figure Chapter 1-4. Surface mounting to tile ceilings



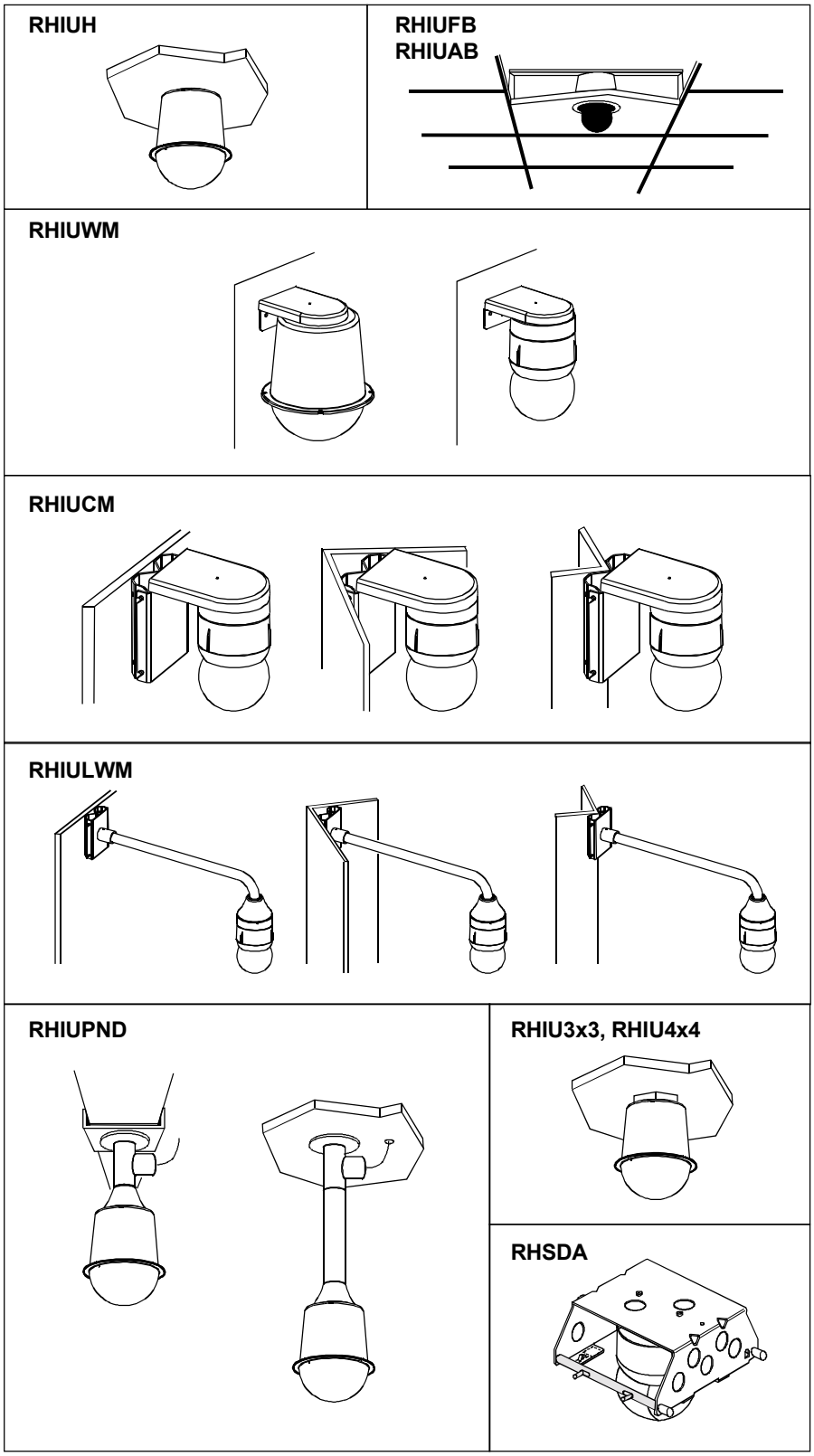
Mounting Structures (Optional)

The dome's base can be mounted to many indoor mounting structures (Figure Chapter 1-5) that attach to indoor walls and ceilings. These structures are as follows:

Product Code	Mounting Structure
RHIUH	**Top hat housing with trim ring.** Contains the camera dome. This housing can be used independently or as part of the following mounting structures. It also can be used with the following bubbles: RU105UD Clear bubble RU106UD Silver bubble RU107UD Smoked bubble RU108UD Gold bubble
RHIUFB*	**Fixed bracket.** Allows top hat housing to be recessed into 2x2 drop ceiling or in hard ceilings such as sheet rock, plaster, and wood (requires top hat RHIUH).
RHIUAB*	**Adjustable bracket.** Allows the top hat housing to be recessed into 2x4 drop ceiling tiles (requires top hat RHIUH).
RHIUWM*	**Wall mount structure.** For direct wall installation (top hat housing RHIUH is optional).
RHIUCM*	**Wall mount structure with corner feature.** Allows dome to mount directly to the wall, or to inside or outside corners (top hat housing RHIUH is optional).
RHIULWM*	**Long .6m (24") wall mount structure with corner feature.** Allows dome to see over furniture, shelving, and displays, and to mount directly to the wall, or to inside or outside corners (top hat housing RHIUH is optional).
RHIUPND*	**Pendent mount.** Allows dome to suspend from a structural I-beam or hard ceiling (top hat housing RHIUH is optional). Used for indoor ceilings at least 6m (20ft) high.
RHIU4x4	**4x4 mounting plate.** Allows dome to attach to a standard 4 x 4 duplex electrical box (top hat housing RHIUH is optional).
RHIU3x3	**3x3 mounting plate.** Allows dome to attach to a standard 3.5 x 3.5 electrical box (top hat housing RHIUH is optional).
RHSDA	**Adapter bracket.** Allows the dome to be inserted into existing indoor SpeedDome housings. Two sets of spring-loaded locking pins on the bracket enable the light-weight dome assembly to swing out of the housing for servicing or to be removed entirely. This bracket can also be used for outdoor housings.

* These options come in white, but can be easily painted to match decor.

Figure Chapter 1-5. Indoor mounting structures (optional)



Outdoor Mounting Method

The RHSDA adapter bracket facilitates dome mounting to an an existing outdoor SpeedDome housing. This bracket is same one used to mount the dome to an indoor SpeedDome housing. See RHSDA under indoor "Mounting Structures" on page 1-4.

Features

Performance Features

In alphabetical order:

- **Alarm inputs and outputs.** The dome accepts dry-contact-switch closure (3.5mA sink) from up to four sensing devices. Four onboard outputs rated at 30Vdc/ 40mA (with +12Vdc available) enable the dome to control activities such as turning on lights or initiating sound messages.
- **Apple Peel Default Pattern.** When no programmed patterns are entered into its software, the dome automatically defaults to an "apple peel" pattern where, starting at the ceiling, the camera pans the entire viewing area three times, dropping 30° after each pan.
- **Automatic Calibration.** When power is first applied, the dome calibrates its position-sensing electronics by going through a one-minute motion routine (during which it ignores commands). Once calibrated, the dome is in its "home" position, ready for use, with the lens pointing at wide angle along the top of the ceiling. "Homing" does not occur again unless power is removed.
- **Focus Preference™**. Provides automatic focusing with the benefits of manual override.
- **Automatic Lens Control (ALC)**. Also called auto-iris, this feature enables the lens iris to adjust to different lighting conditions automatically.
- **Automatic/Manual Dome Reset.** A watchdog circuit automatically resets the dome if voltage levels or preprogrammed instructions are incorrect. The dome can be manually reset using keyboard commands from the console.
- **Continuous Rotation.** The dome rotates 360°. There are no end stops.
- **DSP Motor Control.** All lens motors are assembled on a balanced mechanism that supports high-speed pan and tilt movements. Digital signal processing (DSP) and dynamic motor braking assure precise and fluid camera movement and accuracy.
- **High resolution cameras.** The dome uses monochrome and color cameras. These cameras have 12X optical zoom with continuous auto focus and backlight compensation. An electronic zoom provides selectable magnification up to 18X or 48X.
- **Iris Preference™**. Iris Preference combines the flexibility of manual iris with the benefits of auto iris by enabling the operator to manually fine-tune back lighting problems for precise and accurate illumination of the subject.
- **Low power consumption**. Draws less power than a typical night light (7.5W max.).
- **Multiple Speed Ranges.** Allows 0–100°/second pan during manual surveillance, or 220°/second pan during automatic surveillance (for fast target acquisition).
- **Previous View After Power Interruption**. The dome returns to the target it was looking at within 50 seconds after a momentary interruption; within 120 seconds after an extended interruption.
- **QuickView™**. The dome can precisely pan, tilt, zoom and focus in one operation. This speed and accuracy enables one SpeedDome Ultra to offer better coverage than multiple fixed cameras.
- **Transient Protection**. The dome has extensive transient protection on its data input/output channels to protect against lightning and electrostatic discharge. If necessary, the dome can be connected to earth ground via the centertap of the J-Box.
- **Surveillance Pattern.** The dome can be "taught" to continuously pan any designated area, and to zoom-in for close-ups as it pans.
- **Zoom Adjusted Program (ZAP)™**. This feature automatically adjusts pan and tilt speeds to keep the video image constant as the camera lens adjusts from wide angle to telescopic. For example, a 12x lens panning at 100°/second at full telephoto slows to 0.5°/second at full zoom.

- **180° Flip**. The dome can follow a target as it moves toward the camera, directly beneath it, and away from the camera by flipping its camera 180° at the point where the target passes directly beneath the dome.

Video System Dependent Features

Certain dome features depend on the video system the dome is used with:

- Sensormatic Video Manager system with RS422
- Sensormatic VM8, VM16, or VM96 systems
- American Dynamics AD2083-02 system.

Following are features associated with each type of system.

Video Manager System with RS422

- Pan and tilt speeds of 0.5° to 24° per second scaled to zoom position
- User selectable pan speed multipliers: X1, X2, X3, X4
- Four programmable targets
- Three patterns per dome with Apple Peel as default pattern
- Boundary identification by allowing naming of departments or areas
- Console V-phase adjustment
- Flip function
- Alarm inputs and outputs
- Address range from 1 to 58.

VM8 System

- Proportional pan and tilt speed control scaled to zoom position
- Pan lock, Apple peel, and flip function keys
- Loadable program code
- Console V-phase adjustment
- Flip function
- Address range from 1 to 8.

VM16 System

- Proportional pan and tilt speed control scaled to zoom position
- Four programmable targets
- Three patterns per dome with Apple Peel as default pattern
- Repeat pattern and flip function keys
- Alarm inputs and outputs
- Loadable program code
- Console V-phase adjustment
- Address range from 1 to 16.

VM96 System

- Proportional pan and tilt speed control scaled to zoom position
- Unlimited programmable Quick Views
- Three patterns per dome with Apple Peel as default pattern
- Boundary identification
- Repeat pattern and flip function keys
- Programmable I/O activities
- Alarm inputs can be software configured as “normally open” or “normally closed”
- Loadable program code
- Automatic V-phase adjustment initiated by operator
- Flip function
- Alarm inputs and outputs
- Address range from 1 to 96.

AD2083-02A System

- Proportional pan and tilt speed control, eight speeds scaled to zoom position
- Sixteen programmable targets (presets)
- Three patterns per dome with Apple Peel as default pattern
- Console V-phase adjustment
- Flip function
- Alarm inputs and outputs
- Address range from 1 to 99

Installation & Service Features

In alphabetical order:

- **Daisy-chaining.** Control cables can be daisy-chained from dome to dome (10 domes maximum), using up to 914m (3000ft) of cable.
- **Interchangeability.** Each dome can be easily moved to a new location.
- **Internationally-recognized connectors.** Composite and video cables from the controller connect to the dome via internationally recognized screw-terminal connectors.
- **Line lock**. The dome can free-run on its own internally-generated 2.5MHz signal, or to prevent picture rolling on the monitor, be sync'd to a 50 and 60Hz ac source.
- **Remote manual dome reset.** The dome can be manually reset using keyboard commands from the console.
- **Power and communications LEDs.** On the dome's base, green power and yellow communications LEDs (same as on the J-Box) indicate that power and data are reaching the dome.
- **RS422 communications test pushbutton and LEDs.** A pushbutton and green and red LEDs on the underside of an installed base allow the installer to check RS422 terminations to the dome. The LEDs indicate that RS422 wiring is correct, reversed, open, or grounded.
- **Safety.** The camera dome meets all international regulatory agency standards. Electrically, the dome uses low-voltage Class 2 circuitry, and cable connectors keyed to eliminate electrical hazards during use. An available install/removal tool allows indoor servicing to be performed without a ladder.
- **Simple Installation.** The dome assembly has a twist lock, similar to a smoke detector, for easy ceiling attachment. The dome can be located up to 250m (820ft) from the junction box.
- **V-Phase Adjustment**. The dome has a remote V-phase adjustment that enables synchronization to any line phase by one person at the control console.

Specifications

Operational

Manual Pan/Tilt Speed	1° to 100° per second (scaled to zoom position)
Target Pan/Tilt Speed	220° per second maximum
Pan Travel	360° continuous
Tilt Travel	>90°
Zoom	
Total Zoom	48X
Optical Zoom	12X
Digital Zoom	4X
Zoom Pause at	18X
Pan/Tilt Accuracy	±0.5° (allows targeting up to 12X zoom)
Zoom/Focus Accuracy	±0.5%
Camouflage Lens Density	Clear, f0
Quick View Access Time	<1 second to position at 60% of zoom setting
Auto Synchronization	
Line Locked	Remote V-phase adjustment
Internal	Built-in sync generator
Video Output Connector	Female BNC
Address Range	1-255
Programmable Views	4 with VMRS422 4 with VM16 7 with POS/EM 16 with AD2083-02A Unlimited with VM96
Programmable Patterns	3
Alarm Inputs	4 dry contacts/3.5 mA sink
Alarm Outputs	4 open collector drivers @ 12Vdc, 40mA

Electrical

Primary Source	18 to 30Vac, 50/60 Hz
Design Tolerance	16 to 36Vac, 50/60 Hz
Current	0.85A max.
Power On In-Rush Current	1.5 A
Program Storage	256 Kbytes of Flash memory
Data Storage	96 Kbytes of SRAM
Surge Protection	
Video Output	100A
Power Line	60V, 1.5 joules, 250A
RS422 Comm. Line	5.6V, 0.1 joules, 40A
RS485 Comm. Line	Isolated transformer coupled, .10kA impulse rated gas tube
Alarm Inputs	5.6V, 0.1 joules, 40A

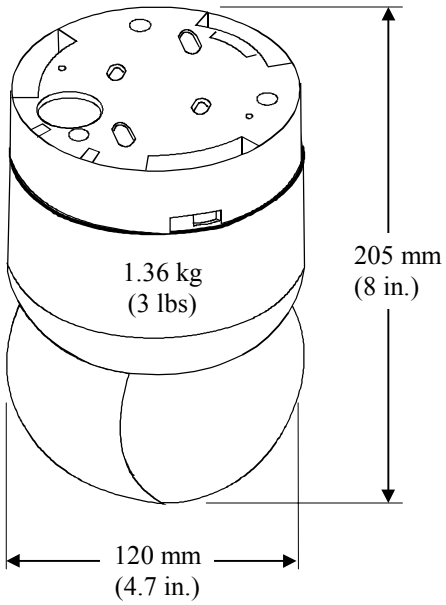
Regulatory

Emmisions	FCC Part 15, Subpart B Class A EN55022 Class B (CE)
Immunity	EN50082-1 (CE)
Safety	UL2044 CSA 22.2 No. 1 (cUL) EN60950 (CE)

Environmental

Operating Temperature	–10° to 50°C (14°–122°F)
Relative Humidity	0 to 95% non-condensing

Mechanical



Camera

Monochrome/Color

Type ..... Interline transfer 1/4” CCD array
Scanning System ..... 2:1 interlace
Video Out ..... 1.0Vp-p/75 ohm composite
Signal-to-Noise ..... 48dB (typical)

Monochrome only

Horizontal Resolution ..... 380 lines at center
Minimum Illumination .... 0.1 lux (AGC on)
AGC ..... >24dB
EIA
- Pickup Device ..... 510 (H) x 492 (V) pixels
- Scanning ..... 525 lines, 60 fields, 30 frames
- Horizontal ..... 15.734 kHz
- Vertical ..... 59.9 Hz internal sync

CCIR
- Pickup Device ..... 510 (H) x 582 (V) pixels
- Scanning ..... 625 lines, 50 fields, 25 frames
- Horizontal 15.625kHz
- Vertical 50Hz

Color only

Horizontal Resolution ..... >450 lines at center
Minimum Illumination .... 2.25 lux (AGC on)
White Balance ..... Through-the-Lens (TTL) Auto Tracing White balance (ATW)
NTSC
Pickup Device ..... 768 (H) x 494 (V) pixels
Scanning ..... 525 lines, 60 fields, 30 frames
Horizontal 15.734kHz
Vertical ..... 59.9 Hz internal sync
PAL
Pickup Device ..... 752 (H) x 582 (V) pixels
Scanning ..... 625 lines, 50 fields, 25 frames
Horizontal 15.625kHz
Vertical 50Hz

Lens

Design ..... Aspherical
Focal Length ..... 4 to 48 mm
Aperture f1.6
Viewing Angle*
- 4 mm ..... 47.0°(H) x 35.2°(V)
- 48 mm ..... 4.0°(H) x 3.0°(V)

*Equivalant to 8mm to 80mm on 1/2 in. CCD array or 11mm to 110mm on 2/3 in. CCD array.

Field-of-View Formulas:

Horizontal view = (.87 x a)/b

Vertical view = (.634 x a)/b

where a = distance from camera in meters or feet

where b = zoom power (such as 12X)

Example of a wide angle view with zoom power of 12X at 18 m from the camera:

(.87 x 18)/12 = 1.2m or 4ft.
(.634 x 18)/12 = .95m or 3ft.

"Indoor" SpeedDome Ultra Camera Dome

INSTALLATION

In this chapter:

Before You Begin

Safety

ALWAYS USE:

- Proper safety equipment for the location and type of installation.
- Proper lift equipment to reach the installation.
- Safety features of the lift equipment.

BE SURE:

- Electrical power is not connected to the dome during installation.
- Electrical power is not connected to nearby fixtures that you might touch during installation.

⚠	**WARNING!** Do not install this product in hazardous areas where highly combustible or explosive products are stored or used.

Verifying and Unpacking

- Verify that all parts have arrived and their configuration is correct.
- Lay out parts in the order you will need them. Do not clutter the area or create a trip hazard.

Tools and Equipment Required

You should have on hand the following equipment:

- Dome Software (latest version)
- Phillips-head screwdriver
- 0.4 x 2.5mm slotted screwdriver (for wire connections)
- Power drill with 1/8”, 1/4”, and 3/8” drill bits
- Hammer
- Socket wrench with 5-inch extension, and 5.5mm, 7mm, 10mm, and 11mm (7/16”) sockets
- 18-14 AWG and 22-20 AWG wire strippers
- Install/Removal tool to attach and detach domes and bubbles without a ladder
- Hand vacuum and broom.

Parts Check

Other than these instructions, in the shipping box for the dome are the following parts:

- Base assembly, 0100-1340-01
- Housing and eyeball assembly, 0100-1036-01
- Installation kit, 0351-1109-01.
- Optional slot cover kit, 0351-1163-01

I/O Board Detachment

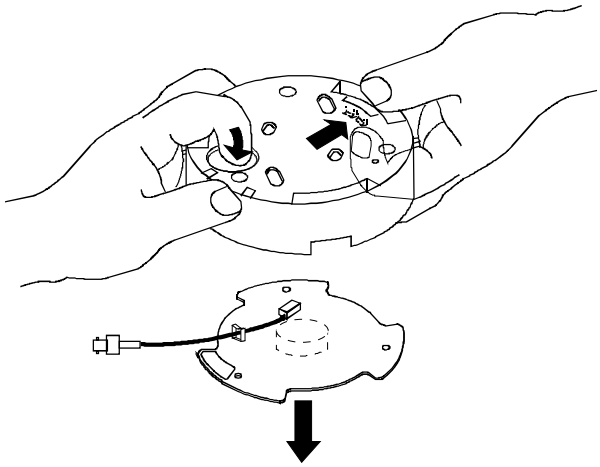
Before beginning the installation procedure, perform the following procedure to detach the I/O board from the dome’s base.

Procedure

⚠	**Dust cover.** The I/O board has a dust cover. DO NOT remove this cover until you have installed the dome’s base. It protects the delicate spring finger connector. Keep the dust cover for use should you have to ship the mounting base back to the manufacturer.
	**CAUTION—ELECTROSTATIC SENSITIVE DEVICE!** Use a grounding strap when handling the board.

Push the fingers away from the board while pushing on the I/O board with your index finger (Figure Chapter 2-1**). Put the board aside in a safe place.**

Figure Chapter 2-1. Detaching the I/O board



Installation Procedure

This section explains how to install the camera dome indoors.

How to Use this Section

1. **Either mount the dome's base directly to the ceiling using parts shipped with the dome or to an optional mounting structure:**

2. **Set up the dome and attach it to its base:**

3. **If used, you can attach an optional skirt and bubble to the top hat or SpeedDome housings:**

Hard/Tile Ceiling Mounting

The following methods show you how to mount the dome's base directly to the surface of a hard ceiling (sheet rock or wood beams) or to the T-bar intersections of a tile ceiling.

Hard Ceiling Surface Mounting

This procedure explains how to mount the dome's base directly to sheet rock or wood beams. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

Install Kit Supplied

0351-1109-01*

a)	Anchor, plastic	2	2880-0073-01
b)	Washer, flat, LOD M4	2	5842-0300-020
c)	Screw, STAP, AB, 4.2 x 32, PHP	2	5810-4091-120

* Only parts used in this procedure are listed.

Procedure

1. **Place the base against the ceiling and mark locations for two mounting holes.**

   Use Figure Chapter 2-2 for sheet rock; Figure Chapter 2-3 for wood. If mounting to sheet rock, also mark the location for the cable access hole.

2. **Drill holes.**

   Sheet rock: Drill two 3/8-inch holes for plastic anchors. Drill one 3/4-inch hole for cable access.

   Wood: Drill two 1/8-inch holes for the mounting screws. If wood covers the cable access hole, drill one 3/4-inch hole for cable access.

3. **Mount the base to the ceiling.**

   Sheet Rock: Install plastic anchors [a]. Then place washers [b] onto screws [c] and insert them into the anchors.

   Wood: Place washers [b] onto screws [c] and insert them into the wood.

4. **Feed cables through the base, then go to "Dome Setup and Attachment", page 2-18.**

Figure Chapter 2-2. Surface mounting to sheet rock

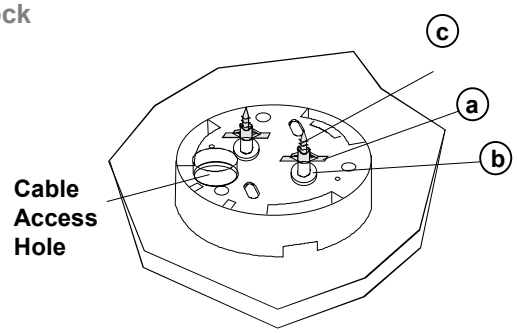
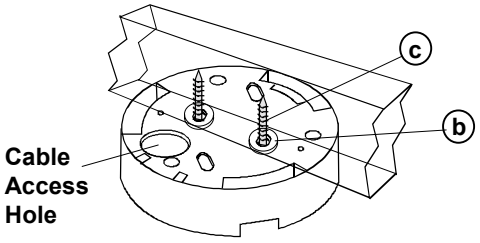


Figure Chapter 2-3. Surface mounting to wood beams



Tile Ceiling Surface Mounting

This procedure explains how to mount the dome's base directly to the T-bar intersection of a tile ceiling. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

Install Kit Supplied

0351-1109-01*

a)	Clip, T-bar	2	0500-7193-01
b)	Screw, PH, M3X-8, PHP, SS	6	5801-1051-120

* Only parts used in this procedure are listed.

Procedure

1. **Using screws [b], attach two dome mounting clips [a] to the base (Figure Chapter 2-4).**
   Pivot screws are circled; they allow the brackets to be maneuvered over the flange of the ceiling T-bar. The other screws secure the base to the T-bar.
2. **Maneuver the brackets over the horizontal flange of the T-bar (Figure Chapter 2-5). Tighten all screws to secure the clips to the T-bar.**
3. **Via the large hole in the base, punch a hole in the ceiling tile for cable access.**
4. **Feed cables through the base, then go to "Dome Setup and Attachment", page 2-18.**

Figure Chapter 2-4. Mounting clip attachment

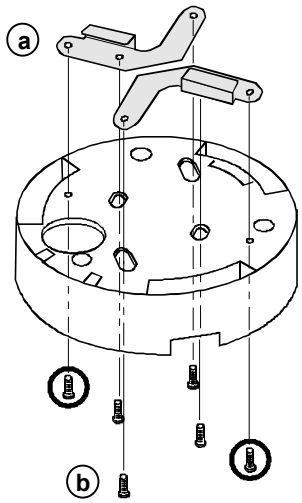
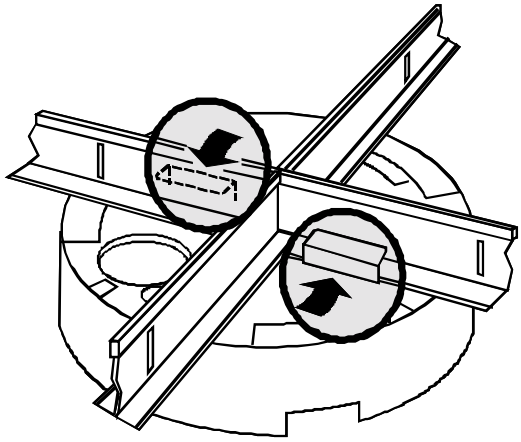


Figure Chapter 2-5. Base attachment to tile ceiling T-bar intersection



Optional Mounting Structures

The following sections explain how to assemble various mounting structures to which the dome's base will mount.

Top Hat Housing

The top hat housing allows the dome to be hidden behind a bubble or recessed into a hard ceiling or ceiling tile. The following procedure explains how to attach the dome's base to the housing and to attach the housing to the ceiling or mounting structure. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

Tools Required

Electric drill with 1/8" and 1/4" bits

Phillips head screwdriver

Ratchet wrench with 127mm (5") extension, and 5.5mm and 10mm sockets.

Mounting Structure Required

01RHIUH Top Hat Housing*

a)	Housing, top hat	1	0500-7455-01
b)	Nut, locking, M3, SS	2	5826-0200-020
c)	Anchor bolt, 1/4x2.25 w/Hdwr	2	2880-0011
d)	Anchor, plastic	2	2880-0073-01
e)	Screw, STAP, AB, 4.2x32, PHP	2	5810-4091-120

* Only parts used in this procedure are listed.

Procedure

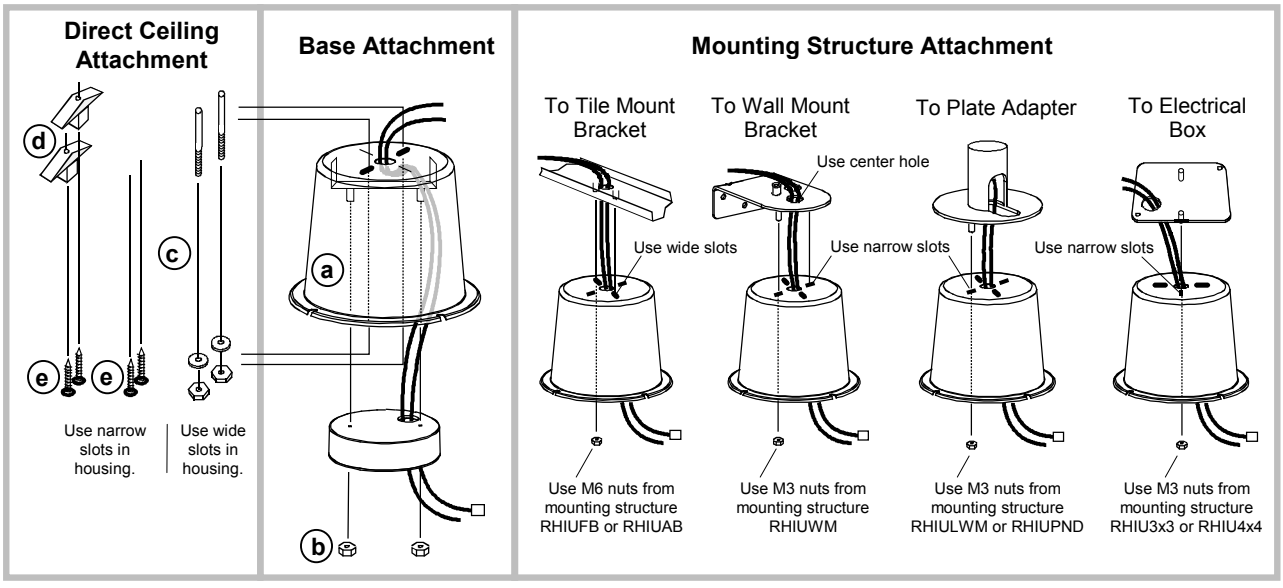
⚠	**Ensure that the ceiling or wall (particularly sheet rock) can support the dome.**

Note: If attaching the housing to a mounting structure, assemble the structure, then skip step 1 of this procedure and go to step 2.

Referring to Figure Chapter 2-6:

1. **If mounting housing [a] directly to a hard ceiling, punch or drill a hole in the ceiling for cable access.**
2. **Attach the housing by performing step a, b, c, or d.**
   a. *To sheet rock:* Use anchor [d] and screw [e].
   b. *To wood:* Use screw [e].
   c. *To concrete:* Use anchor hardware [c].
   d. *To mounting structure:* Use M3 or M6 nuts from the appropriate mounting structure.
3. **Feed cables into housing as shown.**
4. **Attach the base to the top hat housing.**
   Use two M3 locking nuts [b]. Tighten nuts to secure. Feed cables through access hole in base.
5. **Go to "Dome Setup and Attachment", page 2-18.**

Figure Chapter 2-6. Top hat housing



"Fixed" Mounting Bracket for Hard Ceilings or 2x2 Ceiling Tiles

The fixed mounting bracket enables the dome to be recessed in a hard ceiling or 2x2 ceiling tile. The following procedure explains how to assemble the bracket. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

Tools Required

Razor knife

Phillips head screwdriver

Ratchet wrench with 5-inch extension and 10mm socket.

Mounting Structures Required

01RHIUH Top Hat Housing*

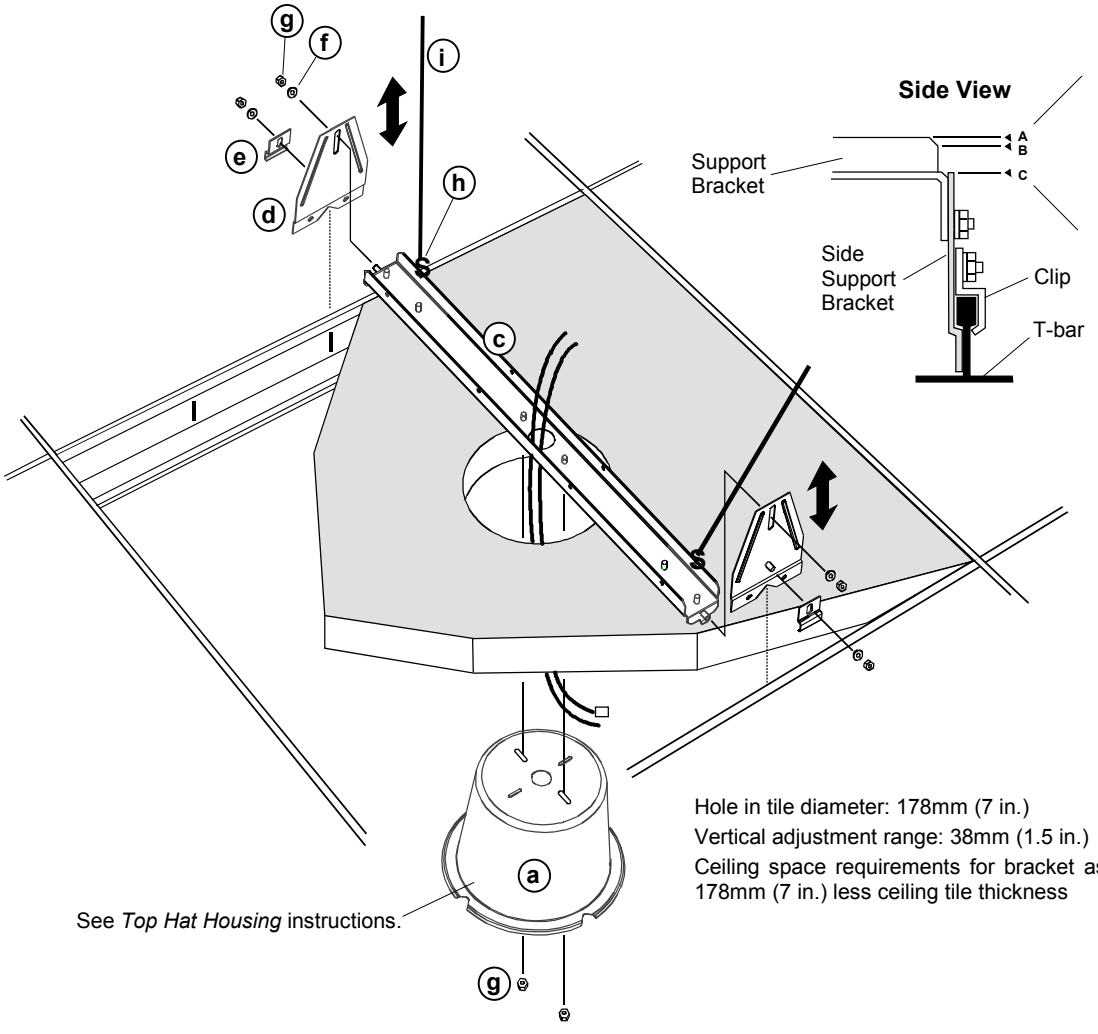
a)	Housing, top hat	1	0500-7455-01

* Only part used in this procedure is listed.

01RHIUFB Recessed Fixed Bracket Hard Mount

b)	Template, cutting (not shown)	1	8001-0466-01
c)	Bracket, support	1	0500-7507-01
d)	Side support	2	0500-7509-01
e)	Clip, mounting bracket	2	0500-7465-01
f)	Washer, flat, LOD, M6, SS	10	5842-0500-020
g)	Nut, locking, M6, SS	10	5826-0500-020
h)	S-Hook, open	2	2897-0004
i)	Chain, sash	6ft	2898-0002

Figure Chapter 2-7. "Fixed" mounting bracket



For the top hat to fit snug against the ceiling, do the following:

Move top of the side support bracket to "A" for 1-inch thick ceilings.

Move top of the side support bracket to "B" for 3/4-inch thick ceilings.

Move top of the side support bracket to "C" to bring the flange of the top hat housing even with the bottom of the side support bracket.

Hole in tile diameter: 178mm (7 in.)

Vertical adjustment range: 38mm (1.5 in.)

Ceiling space requirements for bracket assembly: 178mm (7 in.) less ceiling tile thickness

Procedure

	**Ensure that the ceiling (particularly sheet rock) can support the dome.**

Referring to Figure Chapter 2-7:

1. **Cut a hole in the ceiling tile or hard ceiling.**

   Ceiling tile: Remove the ceiling tile in which the top hat housing will be installed. On the ground, scribe a 178 (±1.5) mm (7 in.) hole in the center of the tile using template [b]. Cut out the hole.

   Hard Ceiling: Use template [b] to scribe a 178 (±1.5) mm (7 in.) hole. Cut out the hole.

2. **Loosely attach side support brackets [d] to each end of the support bracket [c] using M6 washers [f] and nuts [g].**

Note: If installing the bracket in a drop tile ceiling, skip steps 3 through 7, and go to step 8.

Steps 3 through 7 are for hard ceilings only!

3. **Adjust and tighten side support brackets.**

   For a snug fit (to avoid vibrations that can affect picture quality), these brackets adjust up or down to accommodate the thickness of most hard ceilings and ceiling tiles. To properly adjust the side support brackets, see “Side View” in Figure Chapter 2-7.

4. **Slip the entire assembly up through the hole and center the feed-thru hole in the support bracket over the hole in the ceiling.**
5. **Feed cables through the hole in the support bracket.**
6. **Install the top hat housing (see “Top Hat Housing”, page 2-5).**
7. **Go to “Dome Setup and Attachment”, page 2-18.**

Steps 8 through 17 are for ceiling tiles only!

8. **Loosely attach clips [e] to the side support brackets using washers [f] and nuts [g].**
9. **Center side support brackets against T-bars.**

   To easily center the assembly in the open space, ensure that the V-notch in each side support bracket is directly over the center tab insert notch in the T-bar.

10. **Tighten the clips to secure the assembly to the T-bars.**
11. **Seat the modified ceiling tile in the opening.**
12. **Feed cables through the hole in the support bracket.**
13. **Install the top hat housing (see “Top Hat Housing”, page 2-5).**
14. **Lift the ceiling tile adjacent to each end of the bracket assembly and adjust and tighten the side support brackets.**

    For a snug fit (to avoid vibrations that can affect picture quality), these brackets adjust up or down to accommodate the thickness of most ceilings and ceiling tiles. To properly adjust the side support brackets, see “Side View” in Figure Chapter 2-7.

15. **Attach an S-hook [h] to each end of the support bracket.**
16. **For each S-hook, attach one end of safety chain [i] to the S-hook and its other end to a strong ceiling member.**

	**KEEP CHAIN AS TAUT AS POSSIBLE! CLOSE BOTH ENDS OF S-HOOK. DO NOT SECURE TO A SPRINKLER OR FIRE CONTROL SYSTEM!**

17. **Go to “Dome Setup and Attachment”, page 2-18.**

"Adjustable" Mounting Bracket for 2x4 Ceiling Tiles

The adjustable mounting bracket enables the dome to be recessed in a ceiling tile whose shortest dimension is greater than 2 feet. The following procedure explains how to assemble the bracket. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

Tools Required

Razor knife

Phillips head screwdriver

Ratchet wrench with 5-inch extension and 10mm socket.

Mounting Structures Required

01RHIUH Top Hat Housing*

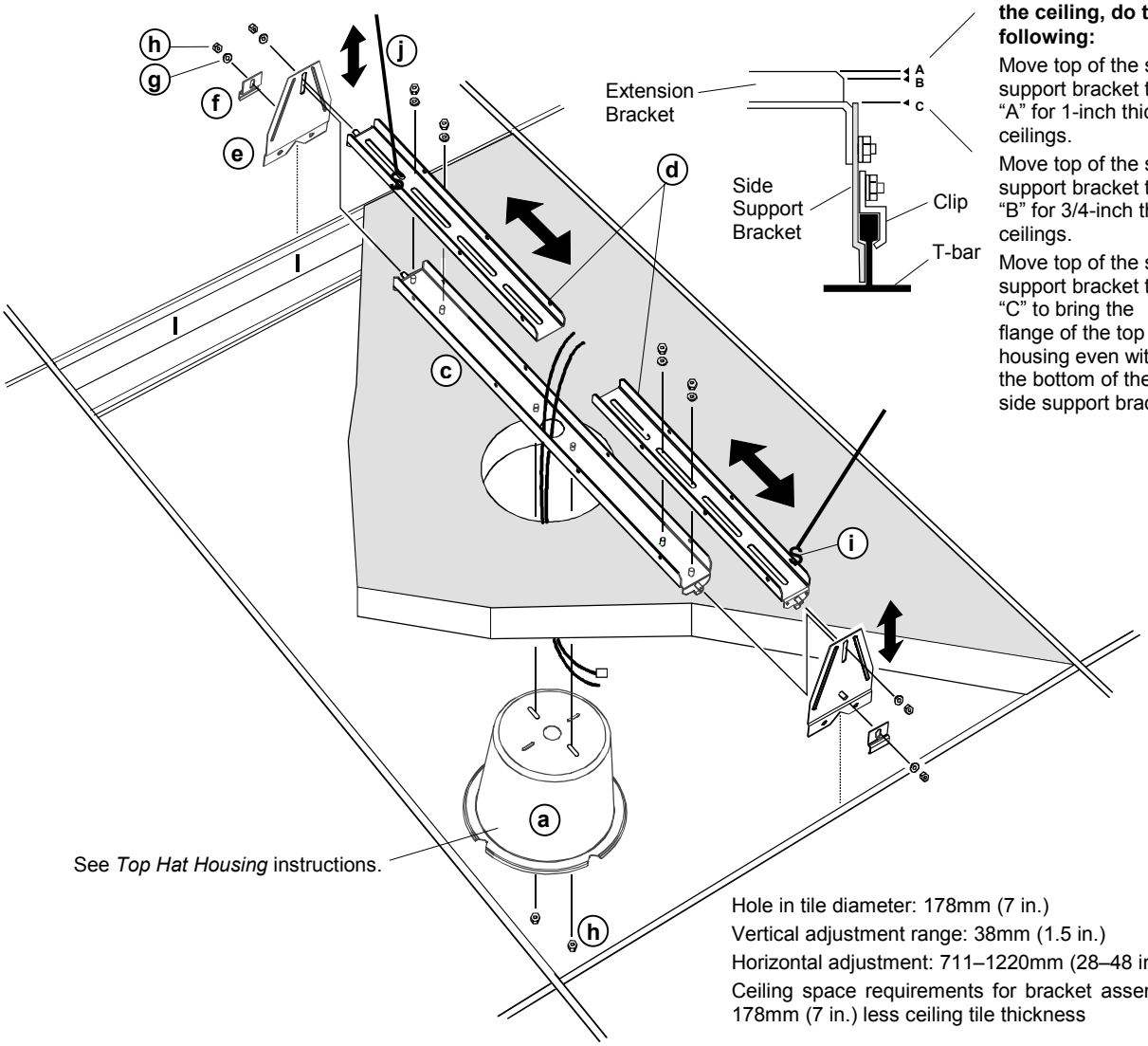
a)	Housing, top hat	1	0500-7455-01

* Only part used in this procedure is listed.

01RHIUAB Adjustable Brkt. 2x4 Ceiling Tile Mount

b)	Template, cutting (not shown)	1	8001-0466-01
c)	Bracket, support	1	0500-7507-01
d)	Bracket, extension	2	0500-7508-01
e)	Side support	2	0500-7509-01
f)	Clip, mounting bracket	2	0500-7465-01
g)	Washer, flat, LOD, M6, SS	6	5842-0500-020
h)	Nut, locking, M6, SS	6	5826-0500-020
i)	S-Hook, open	2	2897-0004
j)	Chain, sash	6ft	2898-0002

Figure Chapter 2-8. "Adjustable" mounting bracket



For the top hat to fit snug against the ceiling, do the following:

Move top of the side support bracket to "A" for 1-inch thick ceilings.

Move top of the side support bracket to "B" for 3/4-inch thick ceilings.

Move top of the side support bracket to "C" to bring the flange of the top hat housing even with the bottom of the side support bracket.

Hole in tile diameter: 178mm (7 in.)

Vertical adjustment range: 38mm (1.5 in.)

Horizontal adjustment: 711–1220mm (28–48 in.)

Ceiling space requirements for bracket assembly: 178mm (7 in.) less ceiling tile thickness

Procedure

	**Ensure that the tile ceiling can support the dome.**

Referring to Figure Chapter 2-8:

1. **Cut a hole in the ceiling tile.**

   Remove the ceiling tile in which the top hat housing will be installed. On the ground, scribe a 178 (±1.5) mm (7 in.) hole in the center of the tile using template [b]. Cut out the hole.

2. **If the distance from T-bar to T-bar is more than 61cm (2ft), loosely attach extension brackets [d] to support bracket [c] using M6 washers [g] and nuts [h].**

   The two extension brackets are used to transverse the extra distance, up to 121cm (4ft) maximum.

3. **Loosely attach side support brackets [e] to each end of the support bracket or, if used, extension brackets using M6 washers [g] and nuts [h].**

4. **Loosely attach clips [f] to the side support brackets using washers and nuts supplied.**

5. **Center side support brackets against T-bars.**

   To easily center the assembly in the open space, ensure that the V-notch in each side support bracket is directly over the center tab insert notch in the T-bar.

6. **Tighten the clips to secure the assembly to the T-bars. Also tighten the extension supports to the support bracket.**

7. **Seat the modified ceiling tile in the opening.**

8. **Feed cables through the hole in the support bracket.**

9. **Install the top hat housing (see “Top Hat Housing”, page 2-5).**

10. **Lift the ceiling tile adjacent to each end of the bracket assembly and adjust and tighten the side support brackets.**

    For a snug fit (to avoid vibrations that can affect picture quality), these brackets adjust up or down to accommodate the thickness of most ceiling tiles. To properly adjust the side support brackets, see “Side View” in Figure Chapter 2-8.

11. **Attach an S-hooks [i] to each end of the bracket assembly.**

12. **For each S-hook, attach one end of safety chain [j] to the S-hook and its other end to a strong ceiling member.**

	**KEEP CHAIN AS TAUT AS POSSIBLE! CLOSE BOTH ENDS OF S-HOOK. DO NOT SECURE TO A SPRINKLER OR FIRE CONTROL SYSTEM!**

13. **Go to “Dome Setup and Attachment”, page 2-18.**

Wall Mount Structure

This procedure explains how to assemble and mount the dome's wall mount structure to a wall. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

!	**Ensure the wall material, particularly sheet rock, can support the dome.**

Tools Required

Level

Phillips head screwdriver

Drill with 1/4" concrete bit

Ratchet wrench with 5.5mm and 11mm sockets.

Mounting Structure Required

01RHIUWM Wall Mount

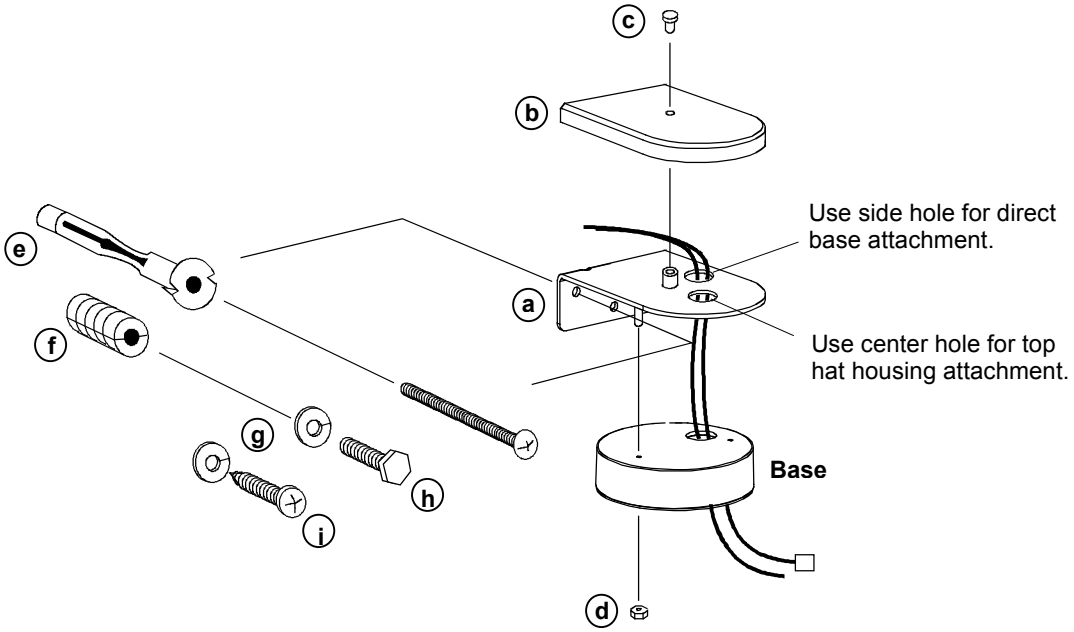
a)	Bracket, wall mount	1	0500-7664-01
b)	Cover, wall mount	1	0500-7663-01
c)	Screw, machine, M3x8, PHP	1	5801-1051-120
d)	Nut, locking, M3, SS	2	5826-0200-020
e)	Anchor, Drywall, w/Screw	3	2880-0025-02
f)	Anchor, Concrete, 1/4-20	3	2880-0079-01
g)	Washer, Locking, 1/4"	3	2847-0101-10
h)	Screw, Mach., HXHD, 1/4-20	3	2802-8501-54
i)	Screw, STAP, 4.8 x 32	3	5810-5091-120

Procedure

Referring to the Figure Chapter 2-9:

1. **Place bracket [a] on wall, level, and mark mounting hole locations.**
2. **Anchor by performing step a, b, or c.**
   a. *To sheet rock:* Use anchor hardware [e].
   b. *To wood:* Use locking washer [g] and screw [i].
   c. *To concrete:* Use anchor [f], locking washer [g], and screw [h].
3. **Attach the base or top hat housing by performing step a or b.**
   a. *Direct base attachment.* Attach the dome's base to the bracket using two M3 locking nuts [d]. Feed cables as shown.
   b. *Top hat housing attachment.* See *Top Hat Housing*, 8000-1648-01.
4. **Place cover [b] over the bracket and secure using one M3x8 screw [c].**
5. **Go to "Dome Setup and Attachment", page 2-18.**

Figure Chapter 2-9. Wall mount structure



Wall Mount Structure with Corner Feature

This procedure explains how to assemble and mount the dome's wall mount structure with corner feature to an inside corner, wall, or outside corner. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

!	**Ensure the wall material, particularly sheet rock, can support the dome.**

Tools Required

Level

Phillips head screwdriver

Drill with 1/4" concrete bit

Ratchet wrench with 5.5mm, 7mm, and 11mm sockets.

Mounting Structure Required

01RHIUCM Wall Mount, Extended

a)	Bracket, Wall Mount	1	0500-7844-01
b)	Bracket, Flush Mount	1	0500-7845-01
c)	Cover, Wall Mount	1	0500-7663-01
d)	Screw, Machine, M3x8, PHP	1	5801-1051-120
e)	Nut, Locking, M3, SS	2	5826-0200-020
f)	Anchor, Drywall. w/Screw	4	2880-0025-02
g)	Anchor, Concrete, 1/4-20	4	2880-0079-01
h)	Washer, Locking, 1/4"	4	2847-0101-10
i)	Screw, Mach., HXHD, 1/4-20	4	2802-8501-54
j)	Screw, STAP, AB, 4.8x32, PHP	4	5810-5091-120
k)	Nut, Hex, M4, SS, Lock	4	5826-0300-020

Figure Chapter 2-10 shows the mounting assembly. Annotations refer to items in the install kit.

Figure Chapter 2-10. Mounting assembly

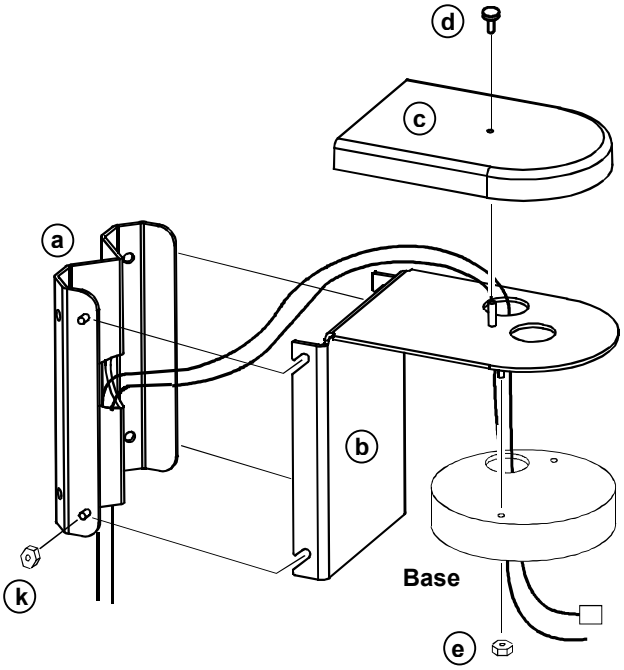
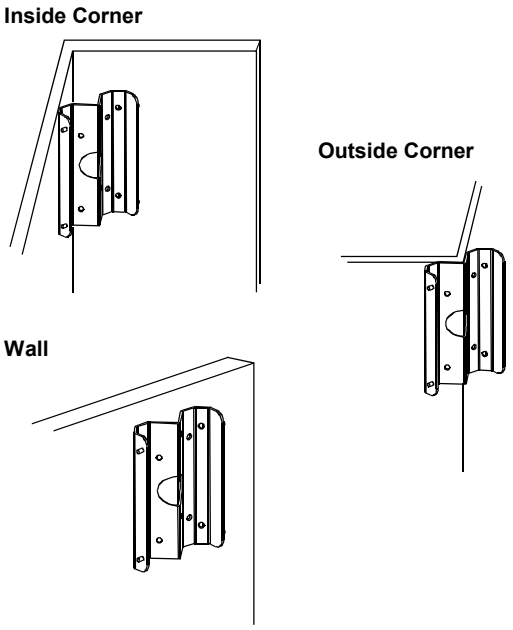


Figure Chapter 2-11 shows how the wall mount bracket [a] attaches to an inside corner, a wall, or an outside corner.

Figure Chapter 2-11. Wall mount bracket mounting methods



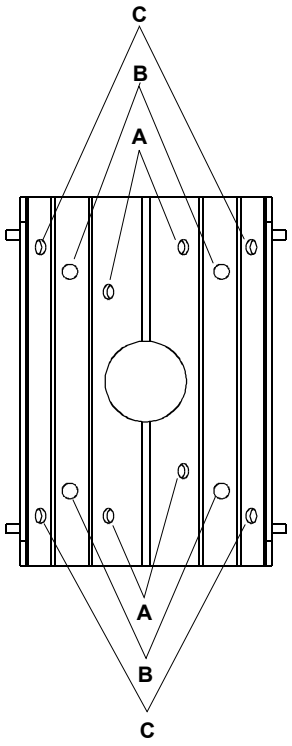
Procedure

Refer back to Figure Chapter 2-10 while performing this procedure:

1. **Place wall mount bracket [a] on wall, level, and mark locations for four mounting holes (Figure Chapter 2-12).**

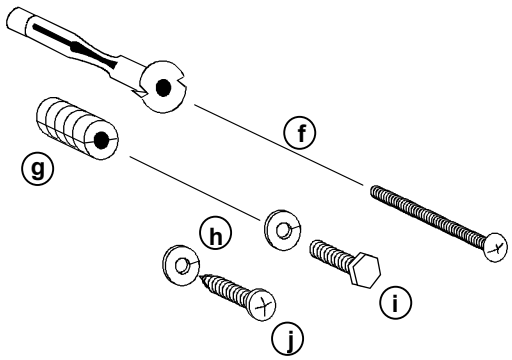
   Use holes marked “A” for mounting to an outside corner, “B” for mounting to a wall, or “C” for mounting to an inside corner.

Figure Chapter 2-12. Wall mount bracket mounting hole selection



2. **Anchor by performing step a, b, or c (Figure Chapter 2-13).**
   a. *To sheet rock:* Use anchor hardware [f].
   b. *To wood:* Use washer [h], and screw [j].
   c. *To concrete:* Use anchor [g], washer [h], and screw [i].

Figure Chapter 2-13. Anchor hardware options



3. **Hook flush mount bracket [b] to wall mount bracket [a] and secure using four hex nuts [k].**
4. **Attach the base or top hat housing by performing step a or b.**
   a. *Direct base attachment.* Attach the dome’s base to the studs on the flange of the arm using two M3 locking nuts [e] Feed cables as shown.
   b. *Top hat housing attachment.* See *Top Hat Housing*, 8000-1648-01.
5. **Place cover [b] over the bracket and secure using one M3x8 screw [d].**
6. **Go to “Dome Setup and Attachment”, page 2-18.**

Arm Extension Structure with Corner Feature

This procedure explains how to assemble and mount the dome's arm extension structure with corner feature to an inside corner, wall, or outside corner. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

!	**Ensure the wall material, particularly sheet rock, can support the dome.**

Tools Required

Level

Phillips head screwdriver

Drill with 1/4" concrete bit

Ratchet wrench with 5.5mm, 7mm, and 11mm sockets.

Mounting Structure Required

01RHIULWM Wall Mount, Extended

a)	Bracket, Wall Mount	1	0500-7844-01
b)	Bracket, Extended Mount	1	0500-7846-01
c)	Arm, Wall Mount	1	0500-7488-01
d)	Cap, Pendent	1	0500-7719-01
e)	Screw, Machine, M4x12, PHP	1	5801-2071-120
f)	Nut, Locking, M3, SS	2	5826-0200-020
g)	Anchor, Drywall. w/Screw	4	2880-0025-02
h)	Anchor, Concrete, 1/4-20	4	2880-0079-01
i)	Washer, Locking, 1/4"	4	2847-0101-10
j)	Screw, Mach., HXHD, 1/4-20	4	2802-8501-54
k)	Screw, STAP, AB, 4.8x32, PHP	4	5810-5091-120
l)	Nut, Hex, M4, SS, Lock	4	5826-0300-020

Figure Chapter 2-14 shows the mounting assembly. Annotations refer to items in the install kit.

Figure Chapter 2-14. Mounting assembly

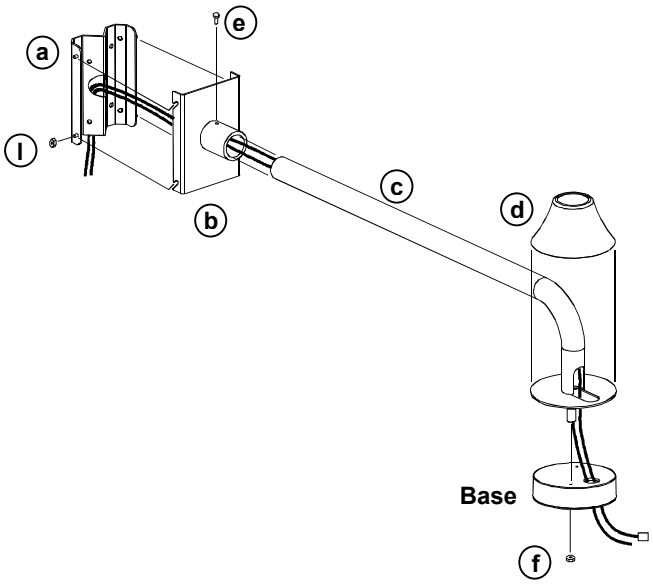
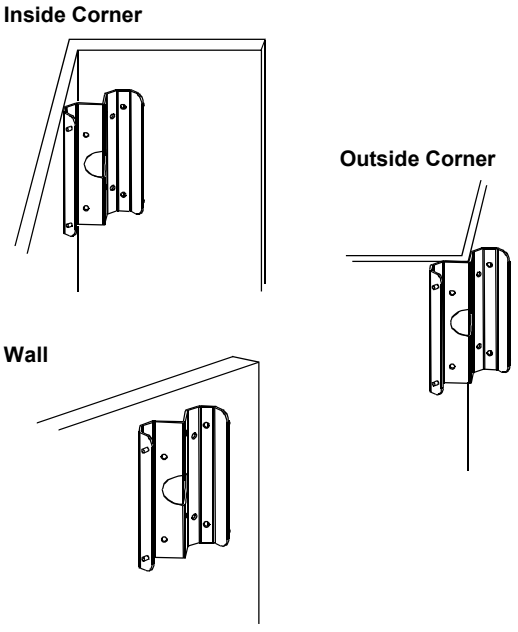


Figure Chapter 2-15 shows how the wall mount bracket [a] attaches to an inside corner, a wall, or an outside corner.

Figure Chapter 2-15. Wall mount bracket mounting methods



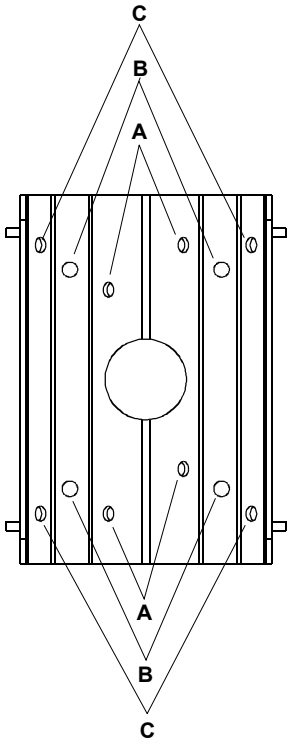
Procedure

Refer back to Figure Chapter 2-14 while performing this procedure:

1. **Place wall mount bracket [a] on wall, level, and mark locations for four mounting holes (Figure Chapter 2-16).**

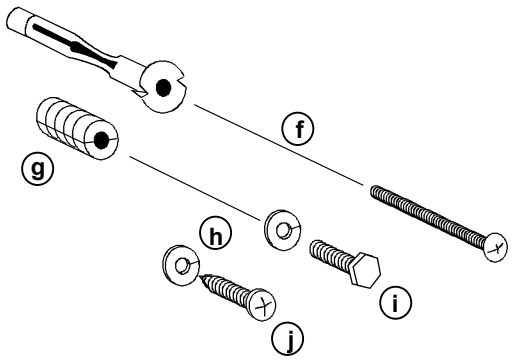
   Use holes marked “A” for mounting to an outside corner, “B” for mounting to a wall, or “C” for mounting to an inside corner.

Figure Chapter 2-16. Wall mount bracket mounting hole selection



2. **Anchor by performing step a, b, or c (Figure Chapter 2-17).**
   a. *To sheet rock:* Use anchor hardware [g].
   b. *To wood:* Use washer [i], and screw [k].
   c. *To concrete:* Use anchor [h], washer [i], and screw [j].

Figure Chapter 2-17. Anchor hardware options



3. **Cut arm [c] to length and slip cap [d] over it.**
4. **Hook extended mount bracket [b] to wall mount bracket [a] and secure using four hex nuts [l].**
5. **Insert the arm into extended mount bracket [b] and secure using one M4x12 screw [e].**
6. **Attach the base or top hat housing by performing step a or b.**
   a. *Direct base attachment.* Attach the dome’s base to the studs on the flange of the arm using two M3 locking nuts [f] Feed cables as shown.
   b. *Top hat housing attachment.* See *Top Hat Housing*, 8000-1648-01.
7. **Go to “Dome Setup and Attachment”, page 2-18.**

Hard Ceiling Pendent Mount

The following procedure explains how to secure the dome's base to a either a ceiling I-beam or hard ceiling using the pendent mounting structure. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

!	**If the ceiling cannot support the camera dome, ask building maintenance to install additional ceiling supports.**

Tools Required

Phillips head screwdriver

Drill with 1/4" concrete bit

Ratchet wrench with 5.5mm and 10mm sockets.

Purchased Part Required

1-1/4 inch straight pipe, 6m (20ft) maximum length, threaded at both ends

Mounting Structure Required

01RHIUPND Pendent Mount

a)	Base plate	1	0500-3975-01
b)	Clamp plate	2	0500-3976-01
c)	Screw, mach., M6x70	4	5801-4194-311
d)	Washer, flat	12	5840-0500-020
e)	Nut, locking, M6, SS	8	5826-0500-020
f)	Flange, 1-1/4 pipe, 4" dia., galv.	1	1400-0069-01
g)	Fitting, pipe tee, 1-1/4", galv.	1	1417-0040-01
h)	Nipple, short, 1-1/4"x2"L, galv.	1	1417-0041-01
i)	Plate, adapter, 1-1/4 pipe	1	0500-7696-01
j)	Cap, pendent	1	0500-7719-01
k)	Nut, locking, M3, SS	2	5826-0200-020
l)	Anchor bolt, 1/4x2.25 w/Hdwr	4	2880-0011

Procedure

Referring to Figure Chapter 2-18:

Note: If bolting directly to ceiling, perform steps 1 and 2, then skip to step 6. If not, go to step 3.

1. **Use the flange [f] to locate and drill mounting holes.**

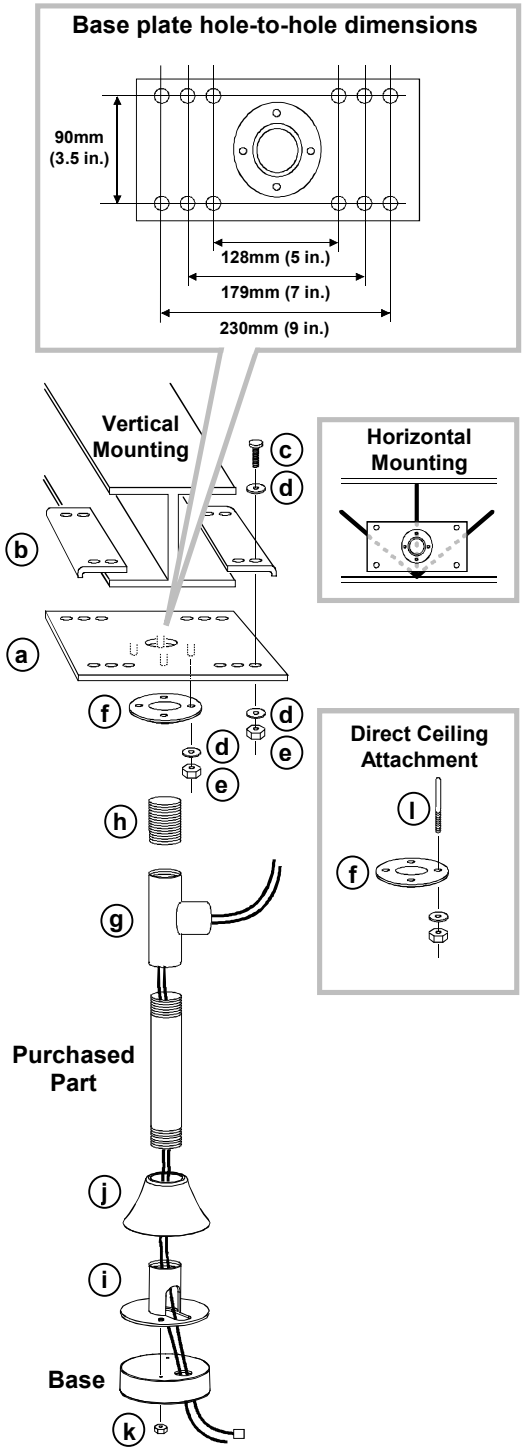
   Mark hole locations on the ceiling for four bolts. Remove the flange and drill four .64cm (1/4in.) holes to the required depth.

2. **Secure the flange to the ceiling using anchor hardware [l].**

3. **Set base plate [a] against a suitable ceiling member (see vertical or horizontal mounting opposite).**

4. **Secure the plate using clamps [b], screws [c], washers [d], and locking nuts [e]. Refer to base plate hole-to-hole dimensions in Figure Chapter 2-18.**

Figure Chapter 2-18. Pendent mount structure



5. **Attach flange using washers [d] and locking nuts [e].**
6. **Thread nipple [h] into the flange.**
7. **Thread pipe tee [g] into nipple.**
8. **Thread the purchased 1-1/4 inch straight pipe onto pipe tee.**
9. **Slip cap [j] up onto the straight pipe.**
10. **Thread plate adapter [i] onto straight pipe.**
11. **Perform step a or b.**
    a. *Direct base attachment.* Attach the dome's base to the studs on the plate adapter using two M3 locking nuts [k]. Feed cables as shown.
    b. *Top hat housing attachment.* See "Top Hat Housing", page 2-5.
12. **Go to "Dome Setup and Attachment", page 2-18.**

Electrical Box Attachment

The following procedure explains how attach the dome's base to a standard 3.5 x 3.5 inch, or 4 x 4 inch electrical box. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

!	**If the electrical box cannot support the camera dome, ask building maintenance to install additional ceiling supports.**

Tools Required

Phillips head screwdriver
Ratchet wrench with 5.5mm socket.

Mounting Structure Required (use Kit A or Kit B)

A) 01RHIU3x3 Standard Electrical Box Mount

a)	Cover, electrical box, 3-1/2" sq.	1	0500-7489-01
b)	Screw, M, FHP, CAD, 8-32x3/8	2	2804-1918-03
c)	Nut, locking, M3, SS	2	5826-0200-020

B) 01RHIU4x4 Standard Electrical Box Mount

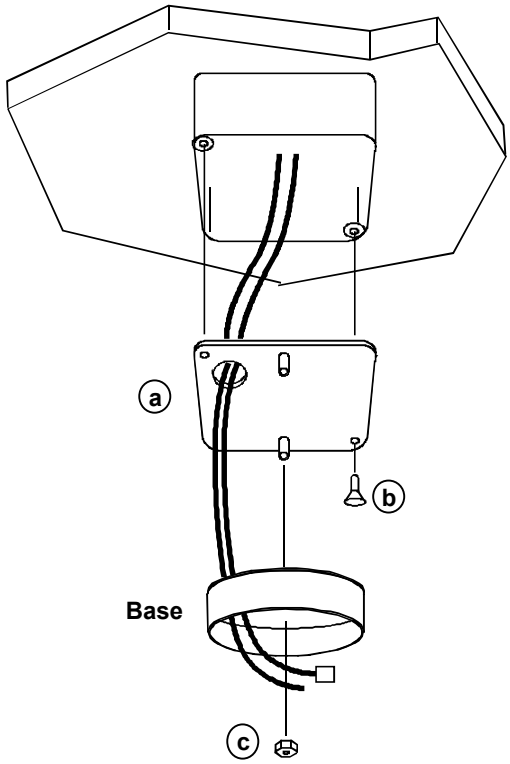
a)	Cover, electrical box, 4" sq.	1	0500-7635-01
b)	Screw, M, FHP, CAD, 8-32x3/8	2	2804-1918-03
c)	Nut, locking, M3, SS	2	5826-0200-020

Procedure

Referring to Figure Chapter 2-19:

1. **Attach cover [a] to the electrical box using screws [b].**
2. **Perform step a or b.**
    a. *Direct base attachment:* Attach the dome's base to electrical box using two M3 locking nuts [c]. Feed cables as shown.
    b. *Top hat housing attachment.* See "Top Hat Housing", page 2-5.
3. **Go to "Dome Setup and Attachment", page 2-18.**

Figure Chapter 2-19. Electrical box mounting structure



Adapter Bracket for Indoor SpeedDome Housings

The following procedure explains how to use an adapter bracket to mount the dome's base in an existing indoor SpeedDome housing. After completing this procedure, go to page 2-18 for dome setup and attachment procedures.

Tool Required

Phillips head screwdriver

Mounting Structure and Install Kit Required

01RHSDA Adapter Bracket*

a)	Adapter bracket assembly	1	0400-0868-01

* Only part used in this procedure is listed.

SpeedDome Ultra Install Kit 0351-1109-01*

b)	Screw, PH, M3x	6	5801-1051-120

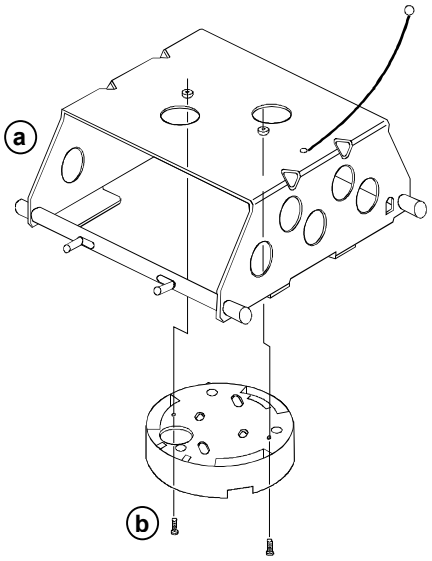
* Only part used in this procedure is listed.

Procedure

1. **Mount the dome assembly's base to the adapter bracket [a] (Figure Chapter 2-20).**

   Use two of six screws [b] to attach the base to the bracket. Tighten screws to secure.

Figure Chapter 2-20. Attaching the mounting base to the adapter bracket



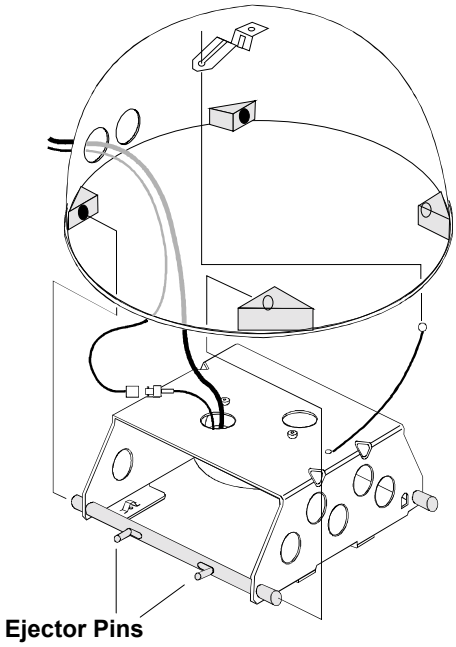
2. **Feed cables as shown, then attach the adapter bracket to the existing dome housing (Figure Chapter 2-21).**

   a. Seat the ball of the lanyard hanging from the adapter bracket into the bracket at the top of the housing.

   b. Squeeze the spring-loaded ejector pins together to seat the adapter bracket in the corner receptacles of the housing.

3. **Go to "Dome Setup and Attachment", page 2-18.**

Figure Chapter 2-21. Attaching the adapter bracket to the indoor SpeedDome housing



Dome Setup and Attachment

The following procedure explains how to connect cables to the I/O board, check cable connections, attach the I/O board to the dome's base, set the dome's address, and attach the dome to its base.

Procedure

	**Ensure that ac power and electrical signals are off during wire connections!**
	**Connectors used in this procedure are very delicate!** DO NOT overtighten these connectors. Use the a 0.4 x 2.5mm slotted screwdriver. Larger screwdrivers can damage the connector.
	**CAUTION—ELECTROSTATIC SENSITIVE DEVICE!** Use a grounding strap when handling the I/O board.

Referring to Figure Chapter 2-22:

1. **Set communications jumpers.**
   On the I/O board, set jumper JW1 for "terminated" or "unterminated" (choose terminated when the dome is at the end of the line). Set jumpers JW2 and JW3 for SensorNet communication protocol.

2. **Connect the video cable.**
   Route cable through the board's cable clamp and connect it to the BNC connector on the I/O board.

3. **Connect the data/power cable.**
   Route this cable through the board's cable clamp and connect its data wires to the P1 connector on the I/O board as follows:

P1 Connector (RS422 Data Communications)

Pin	Color	Designation
1	Orange	RS422 Data In High (+)
2	Green	RS422 Data In Low (–)
3	Yellow	RS422 Data Out High (+)
4	Brown	RS422 Data Out Low (–)
5	—	—
6	—	—

P1 Connector (SensorNet Data Communications)

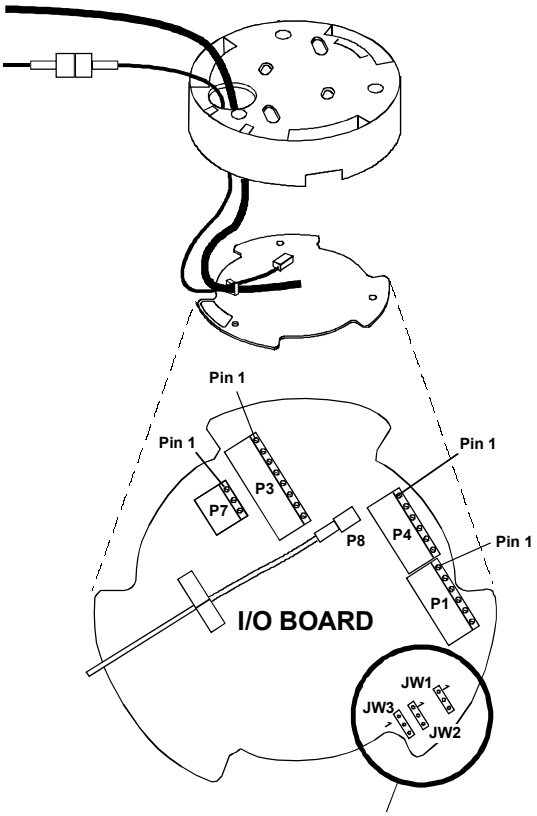
Pin	Color	Designation
1	—	—
2	—	—
3	—	—
4	—	—
5	Orange	SensorNet
6	Yellow	SensorNet

4. **Connect the alarm input cable, if used.**
   Route this cable through the board's cable clamp and connect its wires to the P4 connector on the I/O board as follows:

P4 Connector (Alarm Inputs)

Pin	Color	Designation
1	N/A*	Alarm 3 Input (3.5mA sink)
2	N/A*	Alarm 2 Input (3.5mA sink)
3	N/A*	Alarm 1 Input (3.5mA sink)
4	N/A*	Alarm 0 Input (3.5mA sink)
5	N/A*	Ground
6	N/A*	Ground

Figure Chapter 2-22. Electrical connections



JW1 Terminations

PINS	FUNCTION
1-2	Unterminated
2-3	Terminated

JW2/JW3 Terminations*

PINS	FUNCTION
1-2	SensorNet
2-3	For Future Use

***Jumper locations are not relevant when the dome is hooked up to an RS422 network.**

5. Connect the alarm output cable, if used.

Route this cable through the board's cable clamp and connect its wires to the P3 connector on the I/O board as follows:

P3 Connector (Alarm Outputs)

Pin	Color	Designation
1	N/A*	12Vdc (100 mA max.)
2	N/A*	12Vdc (100 mA max.)
3	N/A*	Output P0 (40mA sync max.)
4	N/A*	Output P1 (40mA sync max.)
5	N/A*	Output P2 (40mA sync max.)
6	N/A*	Output P3 (40mA sync max.)
7	N/A*	Ground
8	N/A*	Ground

6. Connect ac wires.

Connect wires from the data/power cable to the P7 connector on the I/O board as follows:

P7 Connector (AC In)

Pin	Color	Designation
1	Black	AC
2	Red	Ground
3	White	AC

Referring to Figure Chapter 2-23:

7. Connect power to the base.

8. Observe green power and yellow communication LEDs on the other side of the I/O board.

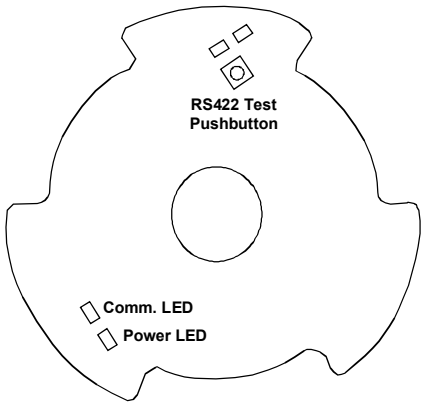
The green LED should be on steady. The yellow LED should flash.

9. Test the communication lines.

If using RS422 communications, press and hold the pushbutton and observe nearby red and green LEDs. These LEDs indicate the following:

- *Constant green with blinking red.* Indicates the RS422 line is correctly wired.
- *Constant green with no red.* Indicates that RS422 "Data In" – is shorted to ground.
- *Constant red with blinking green.* Indicates that the "Data In" + and – wires are reversed.
- *Blinking red, green off.* Indicates that RS422 "Data In" + is shorted to ground.
- *Both LEDs off.* Indicates that "Data In" + or – wires are shorted or open.

Figure Chapter 2-23. I/O board and pushbutton



10. Reattach the I/O Board (Figure Chapter 2-24).

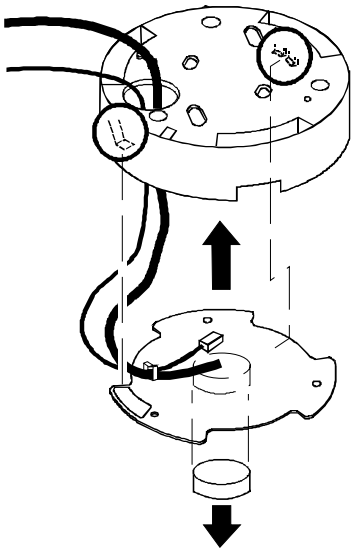
a. If wiring is OK, then pull excess cable up through access hole.

b. Aligning the ground pad with the finger contact above, insert the board under the retaining fingers. Board is keyed; it will only fit into the base one way. Press on board to snap it in place.

c. Gently remove the dust cover from the 32-pin connector and inspect the spring finger contacts. For reliable connections, all contacts should be at least 2mm above the surface of the connector.

!	**Keep the dust cover for use should you have to ship the base and I/O board back to the manufacturer.**

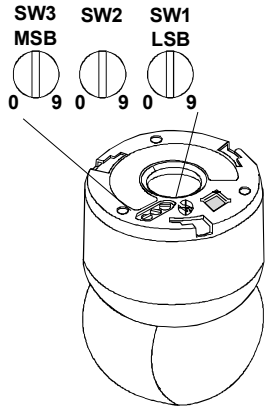
Figure Chapter 2-24. Reattaching the I/O board



11. If required, use the dome's address switches to set the dome's special features (Figure Chapter 2-25).

If you direct the dome to move left and it moves right, then the wrong gear type is selected for the software used. Select the alternative gear type (911 or 912).

Figure Chapter 2-25. Address switches and special feature settings



Special Feature Settings

Pan Gear Type
911 (planetary)
912 (spur)

AGC Enable/Disable
918 (enable AGC)
919 (disable AGC)

Line Lock Enable/Disable
920 (enable line lock)
921 (disable line lock)

Alarm Contacts
922 (normally open)
923 (normally closed)

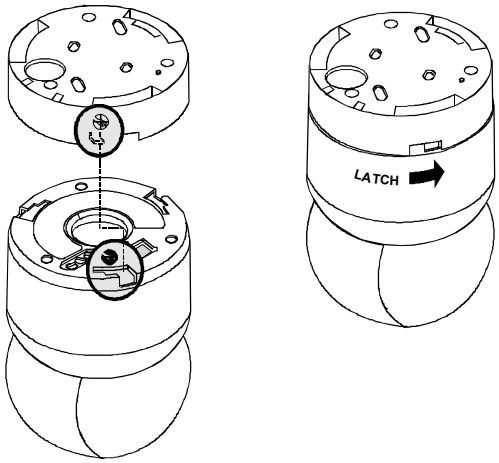
12. Attach the dome to the base (Figure Chapter 2-26).

Align the target on the cap of the dome with the target on the I/O board, then mate the dome to the base and turn it clockwise until you hear a click.

Note: Wait until the "homing" routine initiates before performing the next step. This routine indicates that special feature settings selected in Step 11 have been placed into dome memory.

Note: If using the install/removal tool to attach/detach the dome, see "Using the Install/Removal Tool" on page 2-23 for instructions.

Figure Chapter 2-26. Attaching the dome to its base



13. Detach the dome and reset the rotary switches for the dome address.

The dome address can be set from 001 to 255.

14. Reattach the dome.

Settings selected in step 13 will then be placed into dome memory and the dome will again begin its homing routine.

Skirt and Bubble Attachment

The following procedures show you how to attach skirts and bubbles to a top hat housing or indoor SpeedDome housing.

Note: If using the install/removal tool to attach/detach the skirt or bubble, see "Using the Install/Removal Tool" on page 2-23 for instructions.

Attaching the Skirt to the Top Hat Housing (No Bubble Used)

Install Kit Required

RHIUH Top Hat Housing*

Housing, top hat	1	0500-7455-01
Skirt assembly, top hat	1	0400-0880-01

* Only parts used in this procedure are listed.

Procedure

Referring to Figure Chapter 2-27:

1. **Insert the skirt's T-lanyard into the slot in the top hat housing until both ends of the "T" catch securely.**

> **Insert T-lanyard exactly as shown in Figure 2-22 to ensure that the skirt is securely attached. Ensure that "T" extends fully once inserted.**

2. **Attach the skirt magnetically to the bottom of the top hat housing.**

Attaching the Bubble to the Top Hat Housing (No Skirt Used)

Install Kit Required (pick Kit A, B, C, or D)

A) RU105UD Clear Bubble
B) RU106UD Silver Bubble
C) RU107UD Smoked Bubble
D) RU108UD Gold Bubble

Procedure

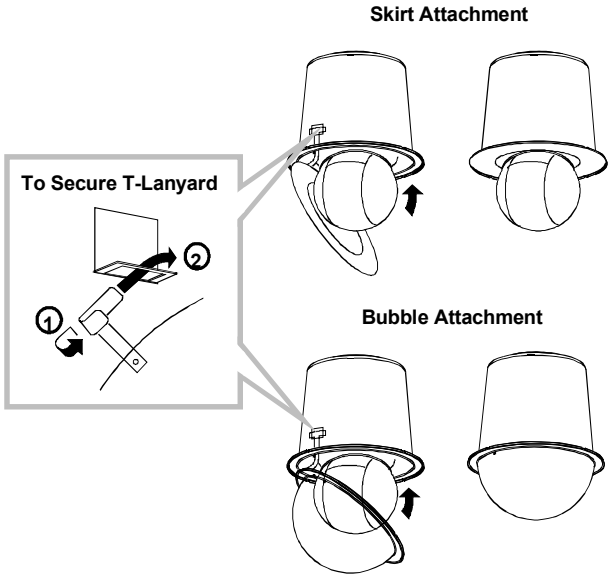
Referring to Figure Chapter 2-27:

1. **Insert the bubble's T-lanyard into the slot in the top hat housing until both ends of the "T" catch securely.**

> **Insert T-lanyard exactly as shown in Figure 2-27 to ensure that the bubble is securely attached. Ensure that "T" extends fully once inserted.**

2. **Attach the bubble magnetically to the bottom of the top hat housing. The skirt is not used in this case.**

Figure Chapter 2-27.Top hat skirt and bubble attachment



Attaching the Skirt to the Indoor SpeedDome Housing (No Bubble Used)

The following procedure explains how to attach a skirt to an indoor SpeedDome housing.

Install Kit Required

RHSDA Adapter Bracket*

Skirt assembly w/o bubble	1	0400-0866-01

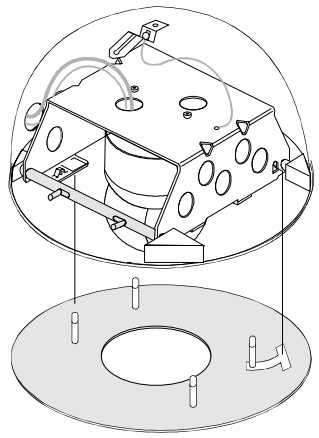
* Only part used in this procedure is listed.

Procedure

Referring to Figure Chapter 2-28:

1. **Insert the skirt's T-lanyard into the slot in the adapter bracket until both ends of the "T" catch securely.**
2. **Push pins of the skirt into their respective receptacles and snap the skirt into place.**

Figure Chapter 2-28. Attaching the skirt to the indoor SpeedDome housing



Attaching the Bubble to the Indoor SpeedDome Housing

The following procedure explains how to attach a bubble to an indoor SpeedDome housing.

Install Kits Required

RHSDA Adapter Bracket*

a)	Skirt, inside bubble	1	0500-7411-01
b)	Tape, foam, Vinyl, .062"x.5"	2.5ft	3200-0214-01

* Only parts used in this procedure are listed.

Pick Kit A, B, C, or D:

A) 0351-0386-01 Clear Bubble
B) 0351-0386-02 Silver Bubble
C) 0351-0386-03 Smoked Bubble
D) 0351-0386-04 Gold Bubble

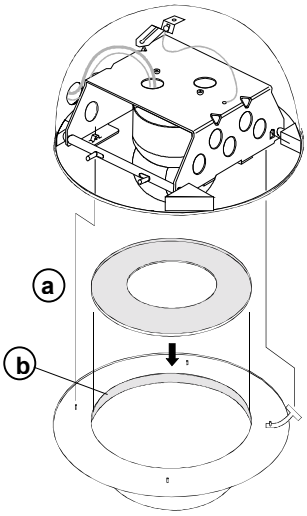
Procedure

Referring to Figure Chapter 2-29:

1. **Insert the skirt [a] into the bubble assembly.**

   A layer of foam tape [b] holds the skirt in place. If the skirt drops below the tape, use the foam tape supplied to apply an additional layer.
2. **Insert the skirt's T-lanyard into the slot in the adapter bracket until both ends of the "T" catch securely.**
3. **Push pins of the bubble into their respective receptacles and snap the bubble into place.**

Figure Chapter 2-29. Attaching the bubble to the indoor SpeedDome housing



Using the Install/Removal Tool

The RHIRT install/removal tool eliminates the need for a ladder during routine service. The tool can be used to:

Detach the skirt or bubble from the housing so the dome can be accessed. The skirt or bubble remain attached to the housing during service.

Attach and detach the dome from its base.

Reattach the skirt or bubble.

Telescopic Pole Required to Use Tool

The tool attaches to a telescopic pole similar to the type used to clean swimming pools. The pole should be 5 feet, 5 inches to 15 feet, 5 inches long and have a 1.170 inch inside diameter to accept the 1.125 inch diameter insert of the tool. If this pole cannot be obtained locally, contact the following manufacturer:

Recreational Water Products
627 E. College Ave.
Decatur, GA 33030

Ask for product code 08140
UPC: 0-14746-58140-2

Procedure

Referring to Figure Chapter 2-30, insert the tool into the top of the pole and maneuver until it snaps in place.

TO ATTACH SKIRT OR BUBBLE: Use the tool to push up on the bubble and to secure it in place. Lower the pole.

TO DETACH SKIRT OR BUBBLE: Lifting the pole up at an angle, use one of the hooks on the tool to catch one of the notches at the side of the housing and pull down. The T-lanyard will prevent the skirt or bubble from falling.

TO ATTACH DOME:

1. **Insert the tool into the top of the pole and maneuver until it snaps in place.**
2. **Insert the dome "eyeball down" into the tool's receptacle.**

   Fins on the housing mate with slots in the tool. Use these fins to properly align the logo (target) at the top of the housing with the label on the tool.
3. **Align label on the tool with the logo (target) on the base. Push the dome up into place.**
4. **Turn the dome clockwise until it clicks.**

   If power is applied, the dome should begin its "homing" routine.
5. **Lower the pole.**

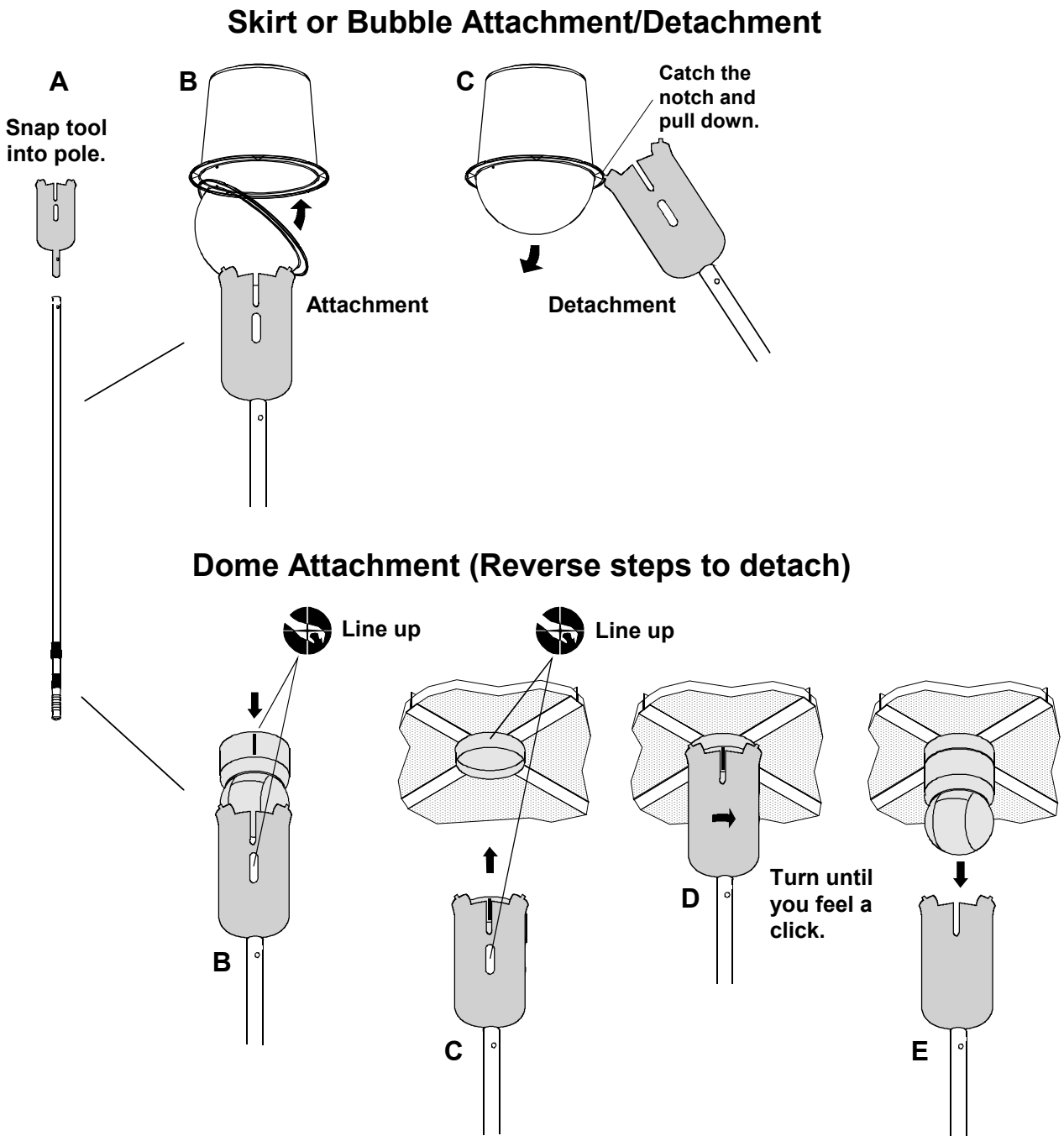
TO DETACH DOME:

1. **Raise the pole and insert the dome "eyeball down" into the tool's receptacle.**

   Fins on the housing mate with slots in the tool.
2. **Turn the dome counterclockwise until it unlocks.**
3. **Lower the pole "vertically" (See following CAUTION).**

	**KEEP THE POLE VERTICAL!** Turning the pole horizontally as you lower it can cause the camera dome to fall out of the tool and possibly break on the floor.
4. **Remove the dome for service.**

Figure Chapter 2-30. How to use the install/removal tool



"Outdoor" SpeedDome Ultra Camera Dome

INSTALLATION

In this chapter:

Before You Begin

Safety

ALWAYS USE:

- Proper safety equipment for the location and type of installation.
- Proper lift equipment to reach the installation.
- Safety features of the lift equipment.

BE SURE:

- Electrical power is not connected to the dome when connecting wires.
- Electrical power is not connected to nearby fixtures that you might touch during installation.

⚠	**WARNING!** Do not install this product in hazardous areas where highly combustible or explosive products are stored or used.

Verifying and Unpacking

- Verify that all parts have arrived and their configuration is correct.
- Lay out parts in the order you will need them. Do not clutter the area or create a trip hazard.

Tools and Equipment Required

You should have on hand the following equipment:

- Dome Software (latest version)
- Phillips-head screwdriver
- 0.4 x 2.5mm slotted screwdriver (for wire connections)
- 18-14 AWG and 22-20 AWG wire strippers
- Install/Removal tool to attach and detach domes and bubbles without a ladder
- Hand vacuum and broom.

Parts Check

Other than these instructions, in the shipping box for the dome are the following parts:

- Base assembly, 0100-1340-01
- Housing and eyeball assembly, 0100-1036-01
- Installation kit, 0351-1109-01.
- Optional slot cover kit, 0351-1163-01

I/O Board Detachment

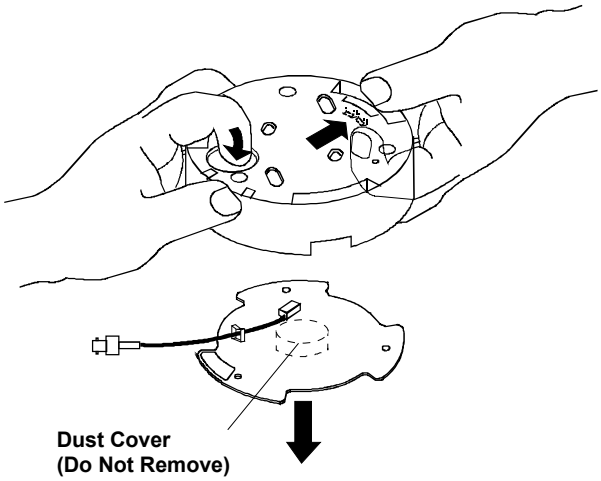
Before beginning the installation procedure, perform the following procedure to detach the I/O board from the dome's base.

Procedure

⚠	**Dust cover.** The I/O board has a dust cover. DO NOT remove this cover until you have installed the dome's base. It protects the delicate spring finger connector. Keep the dust cover for use should you have to ship the mounting base back to the manufacturer.
⚠	**CAUTION—ELECTROSTATIC SENSITIVE DEVICE!** Use a grounding strap when handling the board.

Push the fingers away from the board while pushing on the I/O board with your index finger (Figure Chapter 3-1). Put the board aside in a safe place.

Figure Chapter 3-1. Detaching the I/O board



Installation Procedure

This section explains how to install the camera dome in an outdoor SpeedDome housing.

How to Use this Section

1. **Mount the dome's base in the outdoor housing:**

2. **Set up the dome and attach it to its base:**

3. **Attach the skirt and bubble to the SpeedDome housing:**

Mounting the Dome's Base in the Outdoor SpeedDome Housing

The following procedure explains how to use an adapter bracket to mount the dome's base in an existing outdoor SpeedDome housing. After completing this procedure, go to page 3-4 for dome setup and attachment procedures.

!	**New installations.** If installing the SpeedDome housing as a "new" unit, see the installation instructions suplied with the housing and outdoor mounts, then perform this procedure.

Tool Required

Phillips head screwdriver

Mounting Structure and Install Kit Required

RHSDA Adapter Bracket*

a)	Adapter bracket assembly	1	0400-0868-01

* Only part used in this procedure is listed.

SpeedDome Ultra Install Kit 0351-1109-01

b)	Screw, PH, M3x	6	5801-1051-120

* Only part used in this procedure is listed.

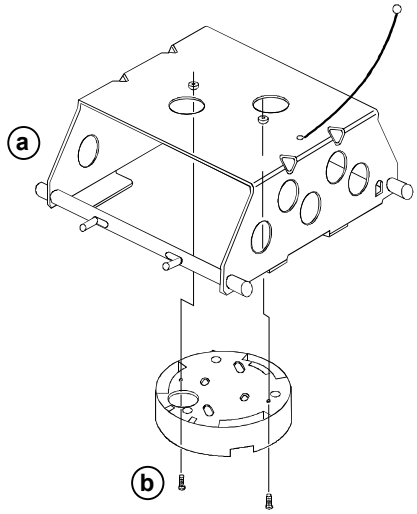
Procedure

If installing a new outdoor housing, begin the procedure at step 4.

1. **Squeeze the spring-loaded ejector pins together to drop the old SpeedDome chassis from the outdoor housing.**
2. **Detach video and data/power cables from the old SpeedDome.**
3. **Find the data/power cable from the outdoor interface board. Remove the connector from this cable.**
4. **Mount the SpeedDome Ultra camera dome's base to the adapter bracket [a] (Figure Chapter 3-2).**

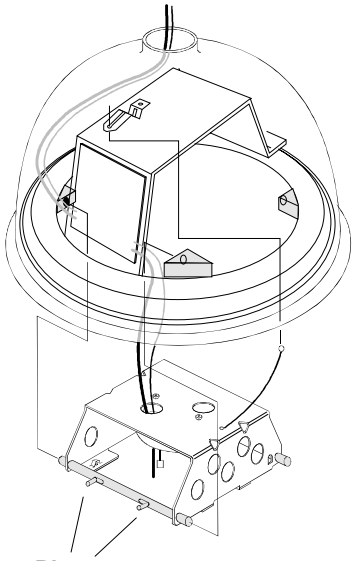
   Use two of six screws [e] to attach the base to the bracket. Tighten screws to secure.

Figure Chapter 3-2. Attaching the mounting base to the adapter bracket



5. **Feed cables as shown, then attach the adapter bracket to the outdoor SpeedDome housing (Figure Chapter 3-3).**
   a. Seat the ball of the lanyard hanging from the adapter bracket into the bracket at the top of the housing.
   b. Squeeze the spring-loaded ejector pins together to seat the adapter bracket in the corner receptacles of the housing.

Figure Chapter 3-3. Attaching the adapter bracket to the outdoor SpeedDome housing



Dome Setup and Attachment

The following procedure explains how to set up and attach the dome to its base.

Procedure

!	**Ensure that ac power and electrical signals are off during wire connections!**
!	**Connectors used in this procedure are very delicate!** DO NOT overtighten these connectors. Use the a 0.4 x 2.5mm slotted screwdriver. Larger screwdrivers can damage the connector.
	CAUTION—ELECTROSTATIC SENSITIVE DEVICE! Use a grounding strap when handling the I/O board.

Referring to Figure Chapter 3-4:

1. **Set communications jumpers.**

   On the I/O board, set jumper JW1 for "terminated" or "unterminated" (choose terminated when the dome is at the end of the line). Set jumpers JW2 and JW3 for SensorNet communication protocol.

2. **Connect the video cable.**

   Route this outdoor interface board cable through the board's cable clamp and connect it to the BNC connector on the I/O board.

3. **Connect the data/power cable.**

   Route this outdoor interface board cable through the board's cable clamp and connect the its data wires to the P1 connector on the I/O board as follows:

   P1 Connector (RS422 Data Communications)

Pin	Color	Designation
1	Orange	RS422 Data In High (+)
2	Green	RS422 Data In Low (–)
3	Yellow	RS422 Data Out High (+)
4	Brown	RS422 Data Out Low (–)
5	—	—
6	—	—

   P1 Connector (SensorNet Data Communications)

Pin	Color	Designation
1	—	—
2	—	—
3	—	—
4	—	—
5	Brown	SensorNet
6	Yellow	SensorNet

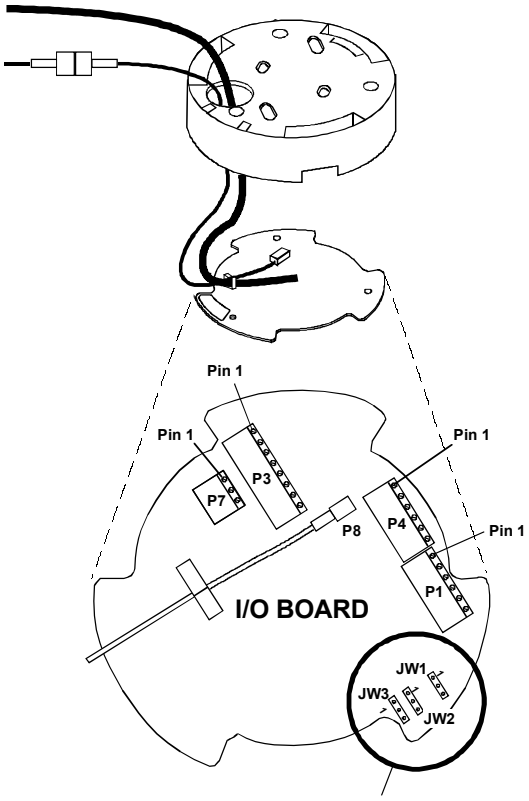
4. **Connect the alarm input cable, if used.**

   Route this cable through the board's cable clamp and connect its wires to the P4 connector on the I/O board as follows:

   P4 Connector (Alarm Inputs)

Pin	Color	Designation
1	N/A*	Alarm 3 Input (3.5mA sink)
2	N/A*	Alarm 2 Input (3.5mA sink)
3	N/A*	Alarm 1 Input (3.5mA sink)
4	N/A*	Alarm 0 Input (3.5mA sink)
5	N/A*	Ground
6	N/A*	Ground

Figure Chapter 3-4. Electrical connections



JW1 Terminations

PINS	FUNCTION
1-2	Unterminated
2-3	Terminated

JW2/JW3 Terminations*

PINS	FUNCTION
1-2	SensorNet
2-3	For Future Use

***Jumper locations are not relevant when the dome is hooked up to an RS422 network.**

5. Connect the alarm output cable, if used.

Route this cable through the board's cable clamp and connect its wires to the P3 connector on the I/O board as follows:

P3 Connector (Alarm Outputs)

Pin	Color	Designation
1	N/A*	12Vdc (100 mA max.)
2	N/A*	12Vdc (100 mA max.)
3	N/A*	Output P0 (40mA sync max.)
4	N/A*	Output P1 (40mA sync max.)
5	N/A*	Output P2 (40mA sync max.)
6	N/A*	Output P3 (40mA sync max.)
7	N/A*	Ground
8	N/A*	Ground

6. Connect ac wires.

Connect the following wires of the data/power cable from the outdoor interface board to the P7 connector on the I/O board as follows:

P7 Connector (AC In)

Pin	Color	Designation
1	Black	AC
2	Red	Ground
3	White	AC

Referring to Figure Chapter 3-5:

7. Connect power to the base.

8. Observe green power and yellow communication LEDs on the other side of the I/O board.

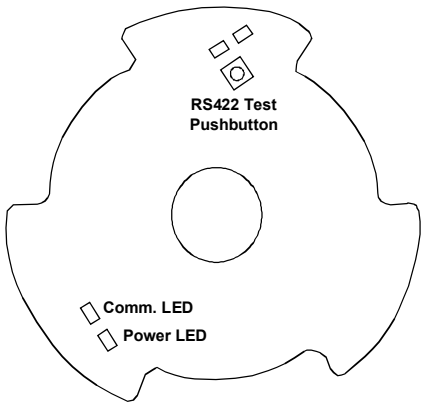
The green LED should be on steady. The yellow LED should flash.

9. Test the communication lines.

If using RS422 communications, press and hold the pushbutton and observe nearby red and green LEDs. These LEDs indicate the following:

- *Constant green with blinking red.* Indicates the RS422 line is correctly wired.
- *Constant green with no red.* Indicates that RS422 "Data In" – is shorted to ground.
- *Constant red with blinking green.* Indicates that the "Data In" + and – wires are reversed.
- *Blinking red, green off.* Indicates that RS422 "Data In" + is shorted to ground.
- *Both LEDs off.* Indicates that "Data In" + or – wires are shorted or open.

Figure Chapter 3-5. I/O board LEDs and pushbutton



10. Reattach the I/O Board (Figure Chapter 3-6).

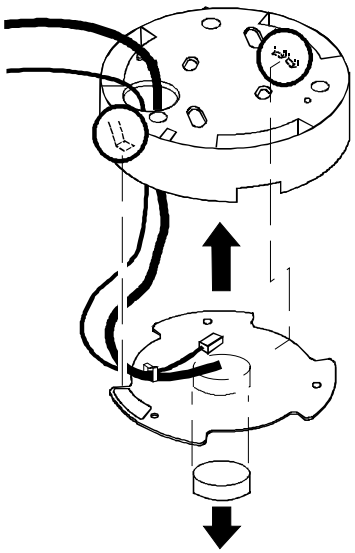
a. If wiring is OK, then pull excess cable up through access hole.

b. Aligning the ground pad with the finger contact above, insert the board under the retaining fingers. Board is keyed; it will only fit into the base one way. Press on board to snap it in place.

c. Gently remove the dust cover from the 32-pin connector and inspect the spring finger contacts. For reliable connections, all contacts should be at least 2mm above the surface of the connector.

!	**Keep the dust cover for use should you have to ship the base and I/O board back to the manufacturer.**

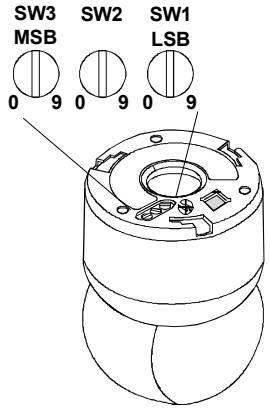
Figure Chapter 3-6. Reattaching the I/O board



11. If required, use the dome's address switches to set the dome's special features (Figure Chapter 3-7).

If you direct the dome to move left and it moves right, then the wrong gear type is selected for the software used. Select the alternative gear type (911 or 912).

Figure Chapter 3-7. Address switches and special feature settings



Special Feature Settings

Pan Gear Type
911 (planetary)
912 (spur)

AGC Enable/Disable
918 (enable AGC)
919 (disable AGC)

Line Lock Enable/Disable
920 (enable line lock)
921 (disable line lock)

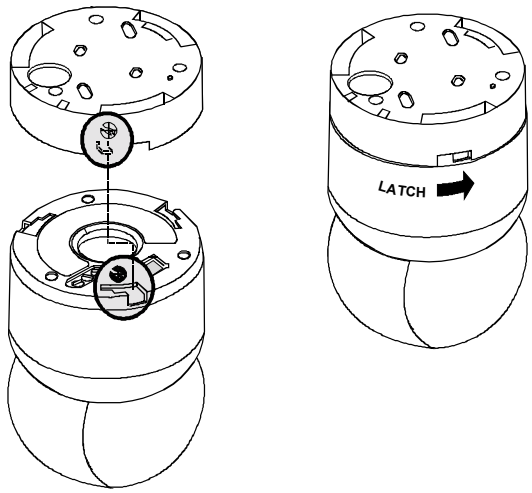
Alarm Contacts
922 (normally open)
923 (normally closed)

12. Attach the dome to its base (Figure Chapter 3-8).

Align the target on the cap of the dome with the target on the I/O board, then mate the dome to the base and turn it clockwise until you hear a click.

Note: Wait until the "homing" routine initiates before performing the next step. This routine indicates that special feature settings selected in Step 11 have been placed into dome memory.

Figure Chapter 3-8. Attaching the dome to its base



13. Detach the dome and reset the rotary switches for the dome address.

The dome address can be set from 001 to 255.

14. Re-attach the dome to its base.

Address settings selected in step 13 will then be placed into dome memory and the dome will again begin its homing routine.

Skirt and Bubble Attachment

The following procedures show you how to attach a skirt and bubble to the outdoor SpeedDome housing.

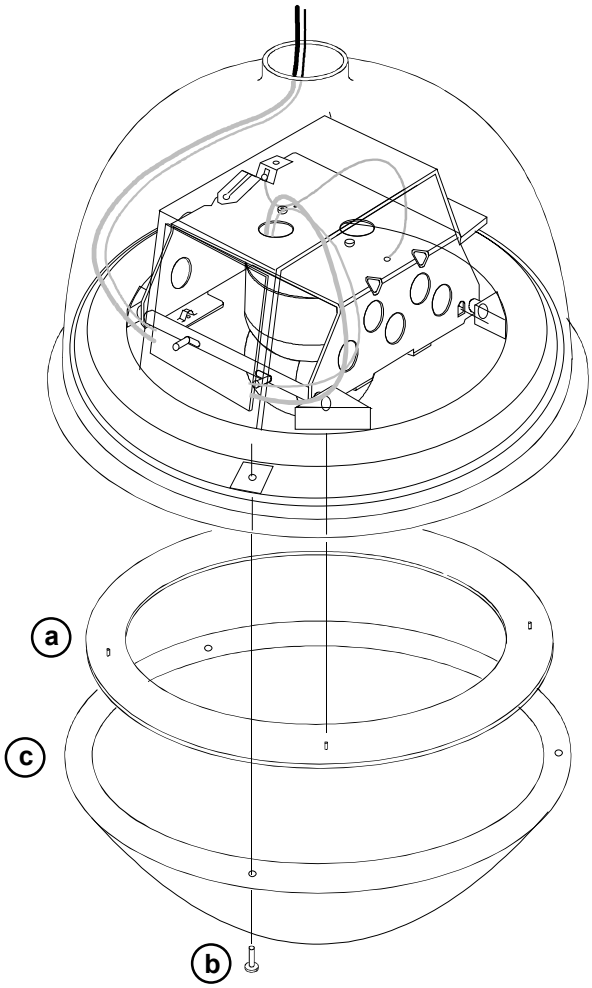
Procedure

Referring to Figure Chapter 3-9:

1. **Push pins of the skirt [a] into their respective receptacles and snap the skirt into place.**

2. **Thread the three screws [b] of the bubble [c] into their respective mounting holes. Tighten the screws to secure.**

Figure Chapter 3-9. Attaching the skirt and bubble to the outdoor SpeedDome housing



SpeedDome Ultra Camera Dome

SERVICE

In this chapter:

Before You Begin

This chapter contains two troubleshooting procedures:

- Routine troubleshooting
- Detailed troubleshooting.

Before you perform the detailed troubleshooting procedure, perform the following steps first:

❑ **Try the routine troubleshooting procedure first!**

Use this procedure to isolate the problem to the dome or its base without disassembling the housing and eyeball assembly (the base is field repairable).

❑ **If you cannot isolate the problem, ship both the base and the dome back to the National Repair Center.**

If the routine troubleshooting procedure does not isolate the problem, then the manufacturer suggests that you ship the dome to the National Repair Center for service. To obtain a repair authorization number, call 1-800-543-9740 (CEs) or 1-800-442-2225 (Dealers).

❑ **If you have no choice but to repair the housing and eyeball assembly.**

Follow the detailed troubleshooting procedure, but use extreme care (see CAUTION below).

	**Fragile parts!** Once disassembled, parts of the dome housing and eyeball assembly are “extremely fragile” and may break. Proceed using extreme care!

Tools and Equipment Required

To service the dome, you should have on hand the following equipment:

- Dome Software (latest version)
- Phillips-head screwdriver
- 0.4 x 2.5mm slotted screwdriver (for wire connections)
- Socket wrench with 5” extension and 5.5mm, 6mm, 8mm, and 10mm sockets
- 14-18 AWG and 20-22 AWG wire strippers
- Install/Removal tool to attach and detach indoor domes, skirts, and bubbles without a ladder.

Routine Troubleshooting

Use this procedure if:

- The dome does not respond to commands
- The dome does not produce video
- The quality of the video is poor
- The dome has no lens control.

Read CAUTIONS below.

	**DO NOT use this procedure if the dome functions but does not pan or tilt.**
	**Ship both the base and dome to the NRC for service.** If you can’t perform routine troubleshooting, we strongly recommend you ship the dome to the National Repair Center for service. If you must perform detailed troubleshooting, use extreme care when disassembling parts!
	**Dust cover.** Place this part over the spring fingers on the I/O board when shipping the base back to the manufacturer.
	**Connectors on the I/O board are very delicate!** DO NOT overtighten these connectors. Use a 0.4 x 2.5mm slotted screwdriver. Larger screwdrivers can damage the connector.
	**CAUTION—ELECTROSTATIC SENSITIVE DEVICE!** Use a grounding strap when handling the I/O board.

Procedure

Perform steps in sequence until the problem is corrected.

1. Check the video on the monitor.

No video? Go to step 2.

Is the contrast or color off?

- YES: Send both the dome and its base back to the National Repair Center. Place the dust cover over the spring fingers on the I/O board.
- NO: Go to step 2.

Does the video roll when switching between monitors?

- YES: Use the video controller or switcher to synchronize the video vertical sync phases of all domes to the ac line. For specific instructions, see the installation and service manual for the controller or switcher.
- NO: Go to step 2.

2. Check ac power and video connections at the J-box.

Is 24Vac absent? Is a video signal absent?

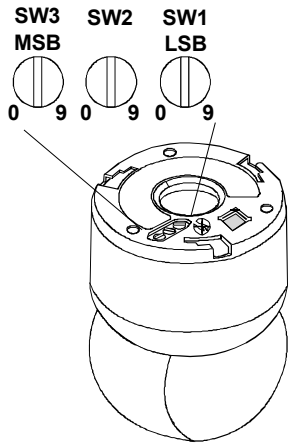
- YES: Correct problem at J-box.
- NO: Go to step 3.

3. Check dome address switches (Figure Chapter 4-1).

Detach the dome from its base and examine the address switches. Are they set correctly?

- YES: If the dome still doesn't respond, then the problem is likely in the dome. Ship both the base and dome (or at least the I/O board and dome) to the NRC. If you must repair the dome, see "Detailed Troubleshooting", page 4-5.
- NO: Set the correct address and reattach the dome.

Figure Chapter 4-1



4. Isolate the problem to the dome or its base.

If another base is nearby, detach the dome and reattach it to the other base. Does it display video or respond correctly to commands?

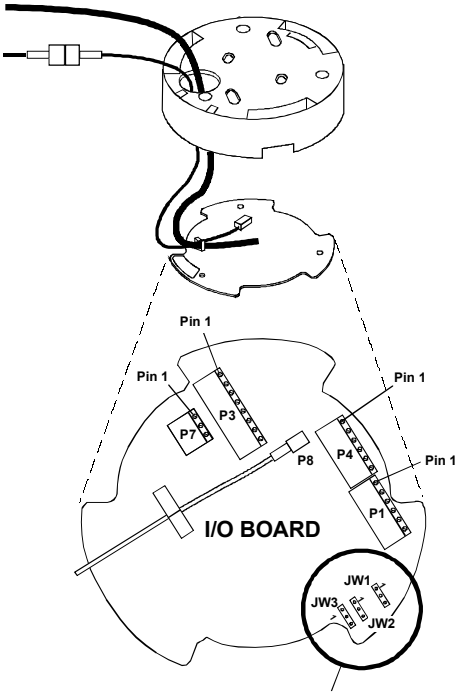
- YES: Then the problem is likely the cable connections to the I/O board or the board itself. Go to step 5.
- NO: Send both the dome and its base back to the National Repair Center. Place the dust cover over the spring fingers on the I/O board.

5. Verify that the coaxial video cable is securely connected to the coax of the I/O board (Figure Chapter 4-2).

Is the cable disconnected?

- YES: Connect the cable.
- NO: Go to step 6.

Figure Chapter 4-2



JW1 Terminations

PINS	FUNCTION
1-2	Unterminated
2-3	Terminated

JW2/JW3 Terminations*

PINS	FUNCTION
1-2	SensorNet
2-3	For Future Use

***Jumper locations are not relevant when the dome is hooked up to an RS422 network.**

6. On the I/O board in the base, observe the green power LED (Figure Chapter 4-3).

Is the green LED off or not on steady?

- YES: Pop the board out and verify that the 24Vac cable is properly attached to connector P7. If O.K., then replace the I/O board.
- NO: Go to step 7.

P7 Connector (AC In)

Pin	Color	Designation
1	Black	AC
2	Red	Ground
3	White	AC

7. On the I/O board in the base, observe the yellow communication LED (Figure 5-3).

Is the yellow LED flashing?

- YES: Go to step 8.
- NO: Pop the board out and verify that the RS422 or SensorNet cable is properly attached to connector P1. If OK, then replace the I/O board.

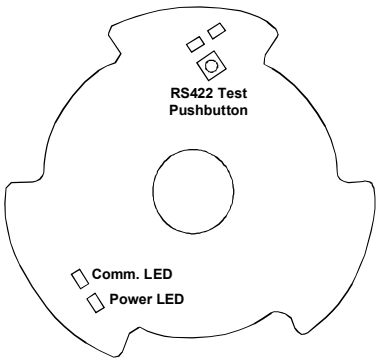
P1 Connector (RS422 Data Comm.)

Pin	Color	Designation
1	Orange	RS422 Data In High (+)
2	Green	RS422 Data In Low (–)
3	Yellow	RS422 Data Out High (+)
4	Brown	RS422 Data Out Low (–)
5	—	—
6	—	—

P1 Connector (SensorNet Data Comm.)

Pin	Color	Designation
1	—	—
2	—	—
3	—	—
4	—	—
5	Orange	SensorNet (brown for outdoor)
6	Yellow	SensorNet

Figure Chapter 4-3



8. If using RS422 communications, check the comm. line connections on the I/O board.

If using RS422 communications, press and hold the pushbutton shown in Figure Chapter 4-3 and observe nearby red and green LEDs. These LEDs indicate the following:

- ***Constant green with blinking red.*** **Indicates RS422 line is correctly wired. Go to step 9.**
- *Constant green with no red.* Indicates that RS422 "Data In" – is shorted to ground. Look for possible shorts. If none are found, replace the I/O board.
- *Constant red with blinking green.* Indicates that the "Data In" + and – wires are reversed. Reverse the wires and retest the board.
- *Blinking red, green off.* Indicates that RS422 "Data In" + is shorted to ground. Look for possible shorts. If none are found, replace the I/O board.
- *Both LEDs off.* Indicates that "Data In" + or – wires are shorted or open. Look for possible shorts or opens. If none are found, replace the I/O board.

9. Check the spring finger connector on the I/O board.

Reattach the dome to its original base to verify solid contact between the spring fingers of the I/O board and the contacts on the CPU board. Does the dome produce video and respond to commands?

- YES: Then it is likely that the spring fingers were not seated properly.
- NO: Then replace the I/O board.

If none of these steps worked, then send both the dome and its base back to the NRC. To obtain a repair authorization number, call 1-800-543-9740 (CEs) or 1-800-442-2225 (Dealers).

If you must perform detailed troubleshooting, use extreme care when disassembling parts! See page 4-5.

Detailed Troubleshooting

Use this procedure if:

- The dome functions but does not pan
- The dome functions but does not tilt
- The dome does not "home" or respond to commands even when attached to another dome's base and its address switches are set correctly (dead dome).

To perform this procedure, you must open the housing and eyeball assembly. The electrical connection between the dome assembly and the mounting base is made via a special 32-pin spring finger connector. All other dome connections are via cable connectors and snap-fit parts.

	**Fragile parts!** Once disassembled, parts of the dome housing and eyeball assembly are "extremely fragile" and may break. Proceed using extreme care!
	**Dust cover.** Place this part over the spring fingers on the I/O board when shipping the base back to the manufacturer.
	**Connectors on the I/O board are very delicate!** DO NOT overtighten these connectors. Use the a 0.4 x 2.5mm slotted screwdriver. Larger screwdrivers can damage the connector.
	**CAUTION—ELECTROSTATIC SENSITIVE DEVICE!** Use a grounding strap when handling PC boards.

Dome Functions but Does Not Pan

If the dome functions but does not pan, you need to access the CPU board (see page 4-6) and/or pan motor (see page 4-7).

On the CPU board, is the pan motor ribbon cable attached to connector P4 and is the metal side of its fingers towards the contacts of the connector?

- YES: Replace the CPU board. And if this doesn't work, replace the pan motor.
- NO: Connect cable(s).

Dome Functions but Does Not Tilt

If the dome functions but does not tilt, you need to access the camera/lens board (see page 4-9) and/or tilt motor (see page 4-10).

On the camera/lens board, is the tilt motor's cable attached to connector J3? Is the slip ring's cable attached to connector J2?

- YES: Replace the camera/lens board. And if this doesn't work, replace the tilt motor.
- NO: Connect cable(s).

Dome Does Not "Home" or Respond to Commands (Dead Dome)

If the dome does not respond, you need to access the CPU board and/or power supply board. For steps on how to do this, see page 4-6.

On the CPU board, is the power supply cable attached to connector P3? Is the slip ring cable attached to connector P2?

- YES: Replace the CPU board. And if this doesn't work, replace the power supply board.
- NO: Connect cable(s).

Dome Disassembly Techniques

This section explains how to remove the following parts from the camera dome.

- CPU board
- Pan motor
- Power supply
- Slot covers
- Camera
- Eyeball assembly
- Camera/Lens board
- Tilt motor

	**Fragile parts!** Once disassembled, parts of the dome housing and eyeball assembly are "extremely fragile" and may break. Proceed using extreme care!

How to Remove the CPU Board

Referring to Figure Chapter 4-4.

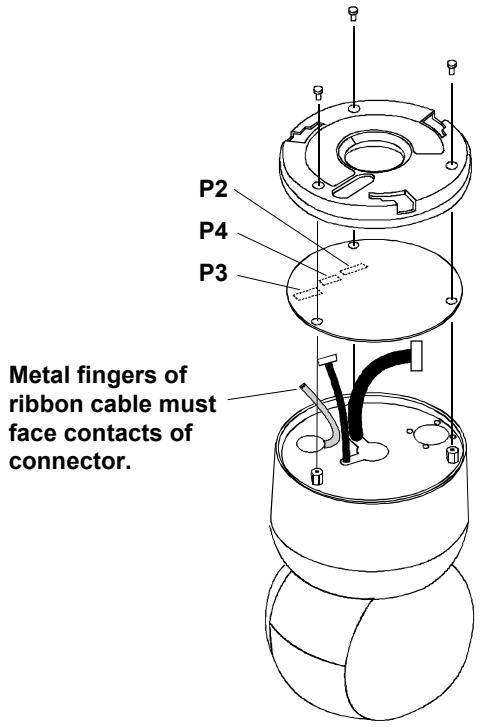
1. **Remove the cap.**
   Remove the three Phillips head screws holding the cap in place, then “gently” lift the cap to one side.
2. **Detach connectors.**
   On the CPU board, detach the 8-pin power supply cable from connector P3, the pan motor cable from connector P4, and the 14-pin slip ring cable from connector P2.
3. **Remove the CPU board.**
   Push your finger through the large finger connector hole in the cap to pop the CPU board out.

	CAUTION—ELECTROSTATIC SENSITIVE DEVICE! Use a grounding strap when handling the board.

Reverse steps to reassemble.

	Be careful not to pinch wires! When inserting the CPU board into the housing, be careful not to pinch the power supply cable wires against the standoffs.

Figure Chapter 4-4



How to Remove the P/S Board

Referring to Figure Chapter 4-5.

1. **Perform the procedure “How to Remove the CPU Board” (this page).**
2. **Remove the metal shield.**
   Remove three standoffs holding the metal shield in place, gently remove the power supply cable grommet from the shield, then “gently” lift the shield out of the housing.

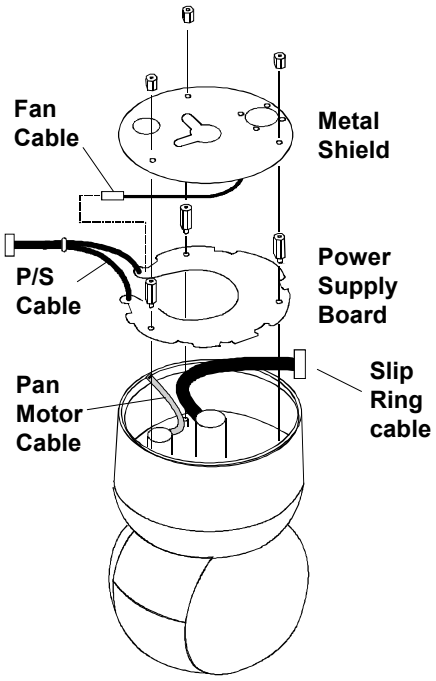
	DO NOT pull on cables! Be careful not to pull on delicate cables attached to the power supply board.

3. **Detach the fan motor cable.**
   This cable connects to connector CN3 on the power supply board.
4. **Remove the power supply board.**
   Remove the three standoffs, then remove the power supply board from the housing.

	CAUTION—ELECTROSTATIC SENSITIVE DEVICE! Use a grounding strap when handling the board.

Reverse steps to reassemble.

Figure Chapter 4-5



How to Remove the Pan Motor

Referring to Figure Chapter 4-6.

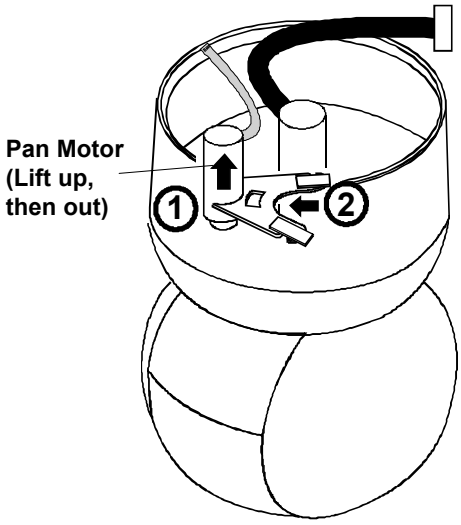
1. **Perform the procedure "How to Remove the CPU Board" (page 4-6).**
2. **Perform the procedure "How to Remove the Power Supply Board" (page 4-6).**
3. **Remove the pan motor.**

   Lift the motor housing up as shown (1) to disengage the motor from the pan gear. Then pull the motor bracket towards the outside of the housing (2) to remove the motor.

Reverse steps to reassemble.

!	**When putting in a new motor, be careful to properly mesh the motor and pan gears!** Failure to do so can destroy both the motor and pan gear. Verify that the pan gear turns freely!

Figure Chapter 4-6

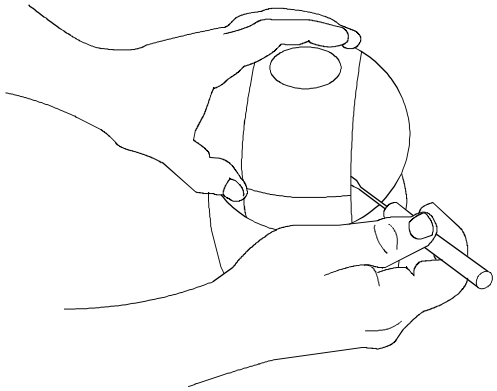


How to Remove the Slot Covers

1. **Insert a small slotted screwdriver (Figure Chapter 4-7).**

   Swivel the eyeball so that one of the two slot covers is totally exposed. Then, insert the screwdriver into the space between the cover and the eyeball.

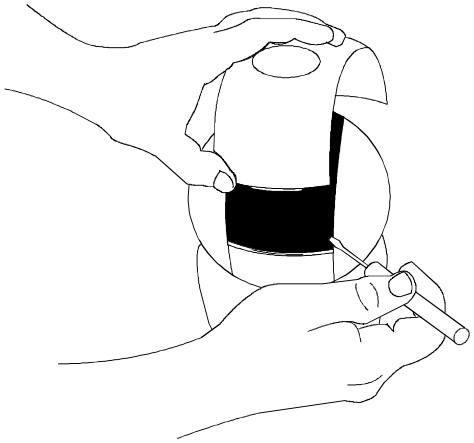
Figure Chapter 4-7



2. **Pry off the slot covers (Figure Chapter 4-8).**

   Gently pry the slot cover loose, then swivel the eyeball so the remaining slot cover is totally exposed. With the other cover removed, this cover can be easily lifted off.

Figure Chapter 4-8

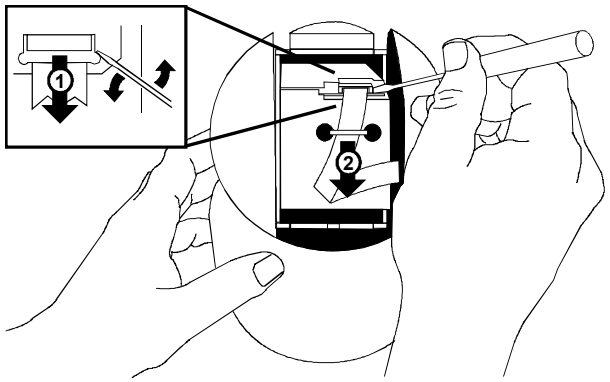


How to Remove the Camera

1. **Perform the procedure "How to Remove the Slot Covers" (page 4-7).**
2. **Remove the ribbon cable from the camera (Figure Chapter 4-9).**

   Swivel the camera yoke to expose the camera connector. Then, using a small slotted screwdriver, 1) "gently" pry the camera connector loose from the camera and 2) pull it down through the cable tie wrap.

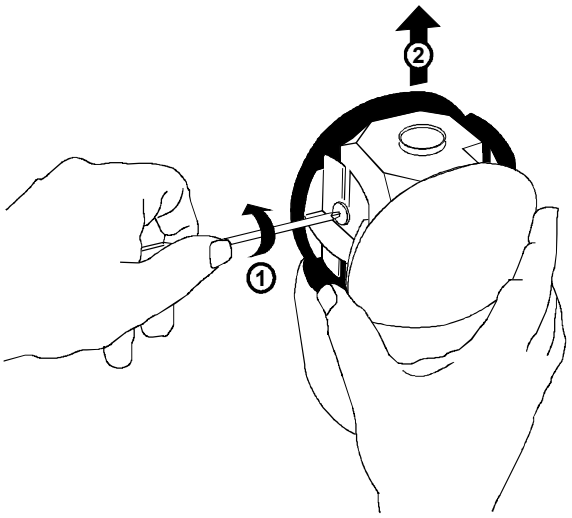
Figure Chapter 4-9



3. **Remove the camera (Figure Chapter 4-10).**

   1) Loosen the screw holding the camera tripod mount, then 2) carefully lift the camera out.

Figure Chapter 4-10



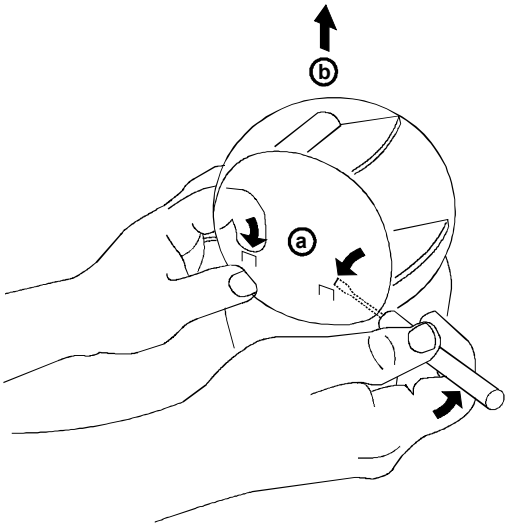
Reverse steps to reassemble. Ensure that ribbon cable pins are inserted "face down".

How to Detach the Eyeball

1. **Perform the procedure "How to Remove the Slot Covers" (page 4-7).**
2. **Perform the procedure "How to Remove the Camera" (this page).**
3. **Detach the eyeball from the housing (Figure Chapter 4-11).**

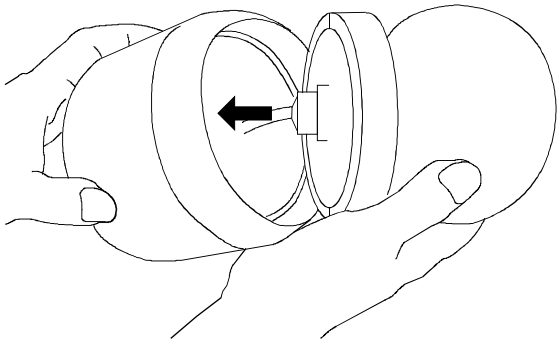
   To do this, turn the yoke to access tabs [a]. One tab will be more accessable than the other. Use your finger to press this tab while, simultaneously, using a small slotted screwdriver to press the other. While pressing the tabs, push up on the eyeball [b] to detach it.

Figure Chapter 4-11



4. **Detach the slip ring connector (Figure Chapter 4-12).**

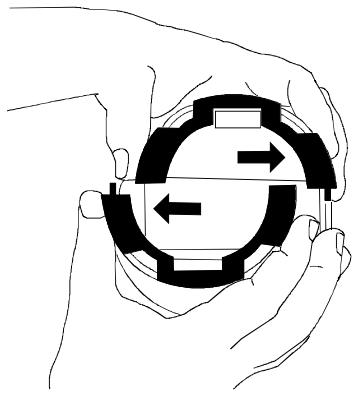
Figure Chapter 4-12



How to Remove the Camera/Lens Board

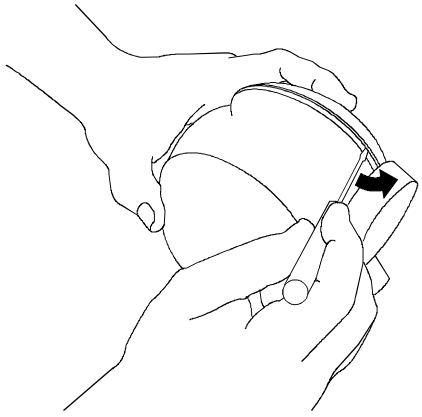
1. **Perform the procedure "How to Remove the Slot Covers" (page 4-7).**
2. **Perform the procedure "How to Remove the Camera" (page 4-8).**
3. **Perform the procedure "How to Detach the Eyeball" (page 4-8).**
4. **Separate the yoke brackets (Figure Chapter 4-13).**

Figure Chapter 4-13



5. **Gently pry off yoke bracket covering the camera/lens board to access the bearing assembly (Figure Chapter 4-14).**

Figure Chapter 4-14



The following steps refer to Figure Chapter 4-15.

6. **Access the camera/lens board.**

   To do this, loosen the captive retaining screw holding the bearing assembly in place and remove this assembly.

7. **Remove cables from the camera/lens board.**
   a. The small amber ribbon cable is from the tilt motor. Unplug this cable from connector J3 on the camera/lens board.
   b. The large grey ribbon cable is from the slip ring connector. Unplug this cable from connector J2 on the camera/lens board.

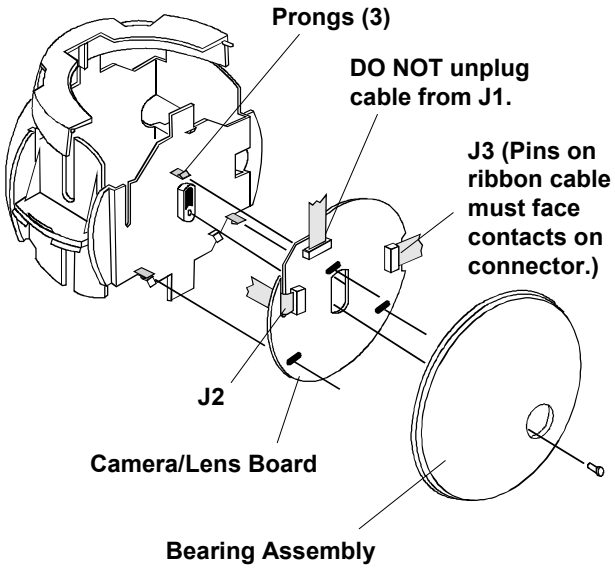
      DO NOT unplug the small white ribbon cable from connector J1.

8. **Push out on the three prongs to detach camera/lens board.**

	**CAUTION—ELECTROSTATIC SENSITIVE DEVICE!** Use a grounding strap when handling the board.

Reverse steps to reassemble.

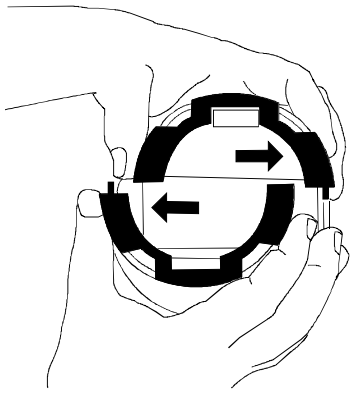
Figure Chapter 4-15



How to Remove the Tilt Motor

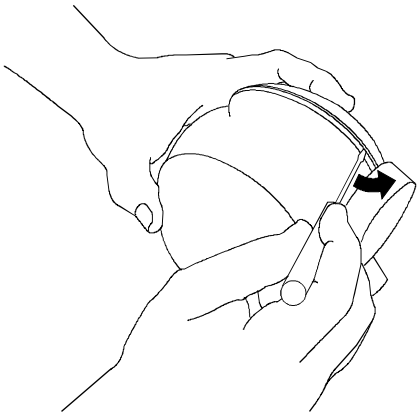
1. **Perform the procedure "How to Remove the Slot Covers" (page 4-7).**
2. **Perform the procedure "How to Remove the Camera" (page 4-8).**
3. **Perform the procedure "How to Detach the Eyeball" (page 4-8).**
4. **Separate the yoke brackets (Figure Chapter 4-16).**

Figure Chapter 4-16



5. **Gently pry off yoke bracket covering the pan gear assembly to access the tilt cable assembly (Figure Chapter 4-17).**

Figure Chapter 4-17



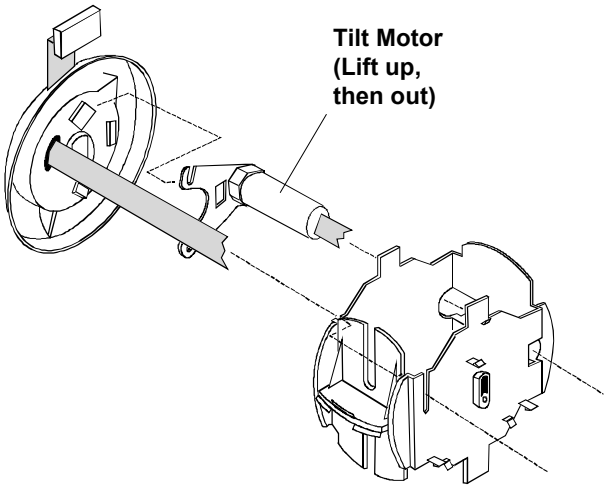
6. **Access the tilt motor.**

   To do this, loosen the captive retaining screw holding the tilt cable assembly in place and gently remove this assembly.

7. **Remove the tilt motor (Figure Chapter 4-18).**

   Lift the motor housing up as shown (1) to disengage the motor from the tilt gear. Then pull the motor bracket towards the outside of the cable/tilt assembly (2) to remove the motor.

Figure Chapter 4-18



Reverse steps to reassemble.

!	**When putting in a new motor, be careful to properly mesh the motor and tilt gears!** Failure to do so can destroy both the motor and tilt gear. Verify that the tilt gear turns freely!

Dome Maintenance

Updating/Reprogramming Dome Software

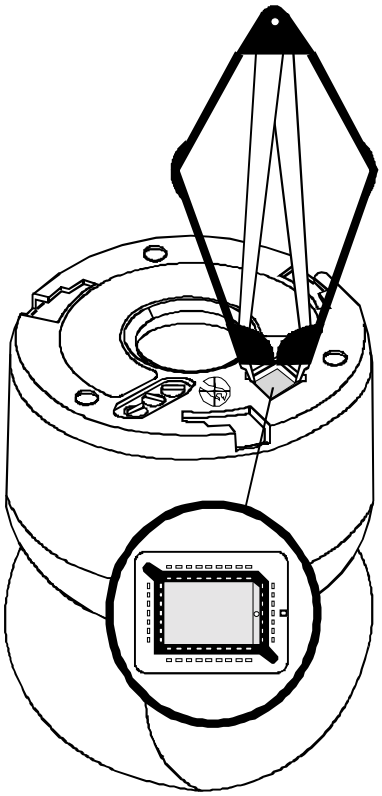
To update or reprogram dome software:

1. **Remove the flash memory chip.**
   Insert the chip extractor tool into the square access hole and squeeze to extract the flash memory chip (Figure Chapter 4-19).

	**CAUTION—ELECTROSTATIC SENSITIVE DEVICE!** Use a grounding strap when handling chip.

2. **Reprogram the chip or replace it with a new chip.**
3. **Reinsert the chip.**
   Align the dot on the chip with the indent on the socket, then push down on the chip to reinsert it.

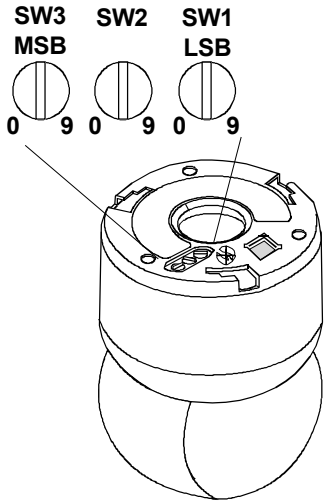
Figure Chapter 4-19



Setting the Dome Address

Recessed at the top of the dome assembly are three rotary switches (Figure Chapter 4-20) which enable the dome address to be changed from 001 to 255.

Figure Chapter 4-20



Changing Special Features

The three rotary switches (Figure Chapter 4-20) also enable special features to be enabled or disabled. To change enable/disable these features:

1. **Enable/Disable the feature.**
   Remove the dome from its base, set the switches to enable/disable the feature, then reattach the dome to enter your settings.

911	Pan motor planetary gear
912	Pan motor spur gear
918	Enable AGC
919	Disable AGC
920	Enable line lock
921	Disable line lock
922	Alarm contacts normally open
923	Alarm contacts normally closed

2. **Reset the address previously entered.**
   Remove the dome again to set the address previously entered, then reattach it. The dome should then begin its homing routine.

AMERICAN DYNAMICS
Sensormatic CCTV Systems Division
One Blue Hill Plaza
Pearl River, NY 10965
Technical Support Center 1-800-442-2225
Business (914) 624-7600

SENSORMATIC ELECTRONICS
951 Yamato Road
Boca Raton, FL 33431-4425
Technical Support Center 1-800-543-9740
Business (561) 989-7000